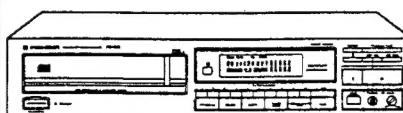


Service Manual



ORDER NO.
ARP2470

COMPACT DISC PLAYER

PD-201 PD-101

PD-201 AND PD-101 HAVE THE FOLLOWING:

| Type | Model | | Power Requirement | Remarks |
|-------|--------|--------|-------------------|---------|
| | PD-201 | PD-101 | | |
| KU | ○ | ○ | AC120V only | |
| KC | ○ | ○ | AC120V only | |
| KUXJS | ○ | ○ | AC120V only | |
| KCXJS | ○ | ○ | AC120V only | |

- This manual is applicable to PD-201/KU, KC, KUXJS, KCXJS, PD-101/KU, KC, KUXJS and KCXJS types.
- For the following: PD-201/KC, KUXJS, KCXJS, PD-101/KU, KC, KUXJS and KCXJS types, refer to pages 43-44.

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SJ MAR. 1992 Printed in Japan

This service manual is intended for qualified service technicians; it is not meant for the casual do-it-yourselfer. Qualified technicians have the necessary test equipment and tools, and have been trained to properly and safely repair complex products such as those covered by this manual.

Improperly performed repairs can adversely affect the safety and reliability of the product and may void the warranty. If you are not qualified to perform the repair of this product properly and safely, you should not risk trying to do so and refer the repair to a qualified service technician.

WARNING

Lead in solder used in this product is listed by the California Health and Welfare agency as a known reproductive toxicant which may cause birth defects or other reproductive harm (California Health & Safety Code, Section 25249.5).

When servicing or handling circuit boards and other components which contain lead in solder, avoid unprotected skin contact with the solder. Also, when soldering do not inhale any smoke or fumes produced.

1. SAFETY INFORMATION

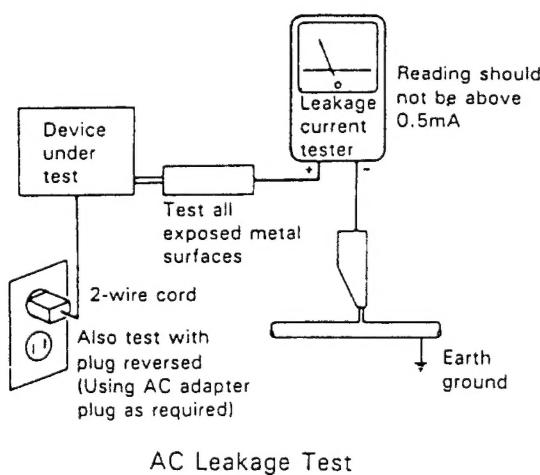
(FOR USA MODEL ONLY)

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a Δ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which does not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

2. DISASSEMBLY

2.1 REMOVING THE TRAY (See Fig. 2 - 1.)

As the claw of the tray cannot be bent, remove the tray according to the following procedures.

- ① Remove the bonnet.
- ② Press the OPEN/CLOSE (\blacktriangle) button on the front panel, and move the tray to the OPEN position.
- ③ Remove the tray name plate.
- ④ Push in the tray.
- ⑤ Remove the clamper base.
- ⑥ Remove the operation panel.
- ⑦ Pull out the tray.

Note: When opening with your hands, do so as follows.

- 1) Pull the right edge Ⓐ of the clamper cam in the direction of the operation panel. The servo mechanism descends, the clamper is released, and the tray opens about 2 cm.

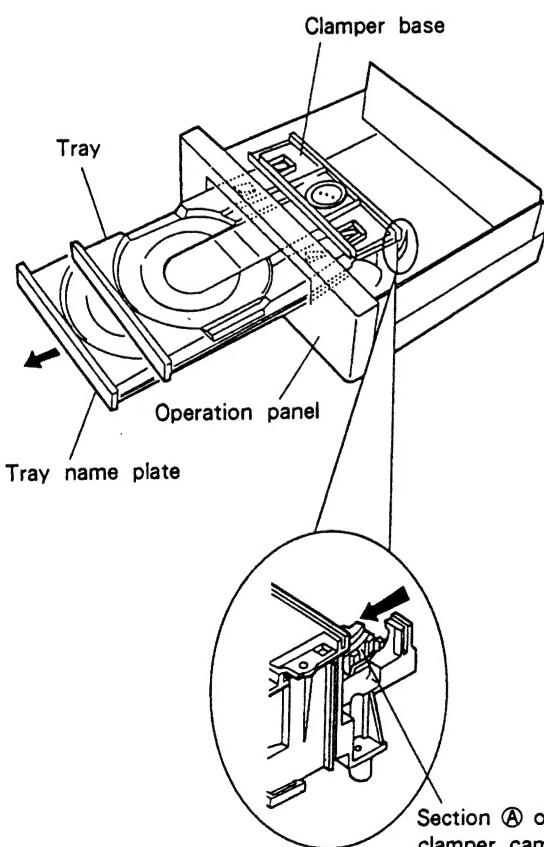


Fig. 2 - 1.

2.2 REMOVING THE SERVO MECHANISM ASSEMBLY

- ① Remove the tray and clamper base. (See 2.1.)
- ② With the servo mechanism assembly in the descended condition (tray open position), remove the 4 screws ⑧ holding this assembly, and screw ⑨ holding the ground lead. Cut the binder holding the bundle of wires onto the loading base with a pair of nippers.

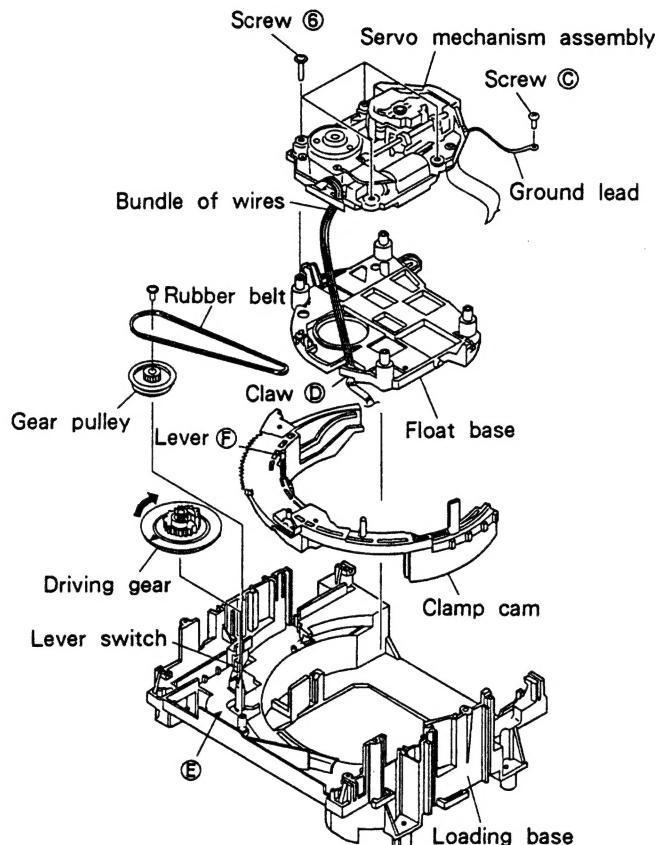


Fig. 2 - 2.

2.3 REMOVING THE FLOAT BASE (See Fig. 2 - 2.)

- ① Remove the servo mechanism assembly. (See 2.2.)
- ② Rotate the driving gear in the clockwise direction fully. The clamp cam will rotate in the counterclockwise direction, and the float base will rise.
- ③ After removing the bundle of wires from claw ⑩ of the float base, remove the float base.

Note: If the clamp cam does not rotate even if the driving gear is rotated, it means that these gears are not engaged. In this case, engage them in the correct position according to the following procedures, and rotate the driving gear.

- 1) Adjust the ▽ mark of the driving gear (on the round hole) to the ▲ mark ⑫ of the loading base.
- 2) Rotate lever F on the clamp cam in the counterclockwise direction.

3

2.4 REMOVING THE CLAMP CAM

- ① Remove the float base. (See 2.3.)
- ② Remove the gear pulley and driving gear.
- ③ After rotating the clamp cam fully in the counter clockwise direction, pull it up.

2.5 REMOVING THE MOTHER BOARD ASSEMBLY

- ① Remove the tray. (See 2.1.)
- ② Remove the operation panel and rear base.

When removing the operation panel, remove the flat cable for the transformer board and the mother board assembly. Moreover, when removing the rear base, remove the cap of the optical digital output terminal.

- ③ Remove screw ⑨ holding the mother board assembly.
- ④ Remove the bundle of wires of the mother board assembly from claw ⑪ of the loading base.
- ⑤ After removing the board from the PCB holder in the order of ① and ② shown in Fig. 2 - 3, pull it out.

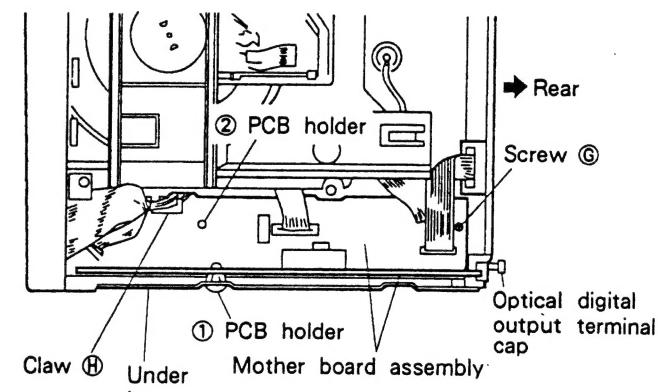


Fig. 2 - 3.

Note 1: After removing the board from the PCB holder ①, move the board slightly to prevent it from attaching to the PCB holder once again. Or, remove the PCB holder ① from the under base (chassis).

Note 2: The mother board assembly is a L-shaped board in which two boards are connected by a jumper wire. (See Fig. 2 - 4.)

During removing and installing, be careful not to bend the jumper wire, apply excessive force onto any part as these may break the jumper wire, cause pattern floating, etc.

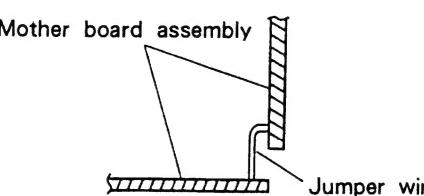


Fig. 2 - 4. Side view of mother board assembly

- ⑥ When examining the board, etc., move the mother board assembly towards the under base as shown in Fig. 2 - 5, and insert the notch of this board to the hook of the rear base to hold it in place. Moreover, connect the flat cable as before.

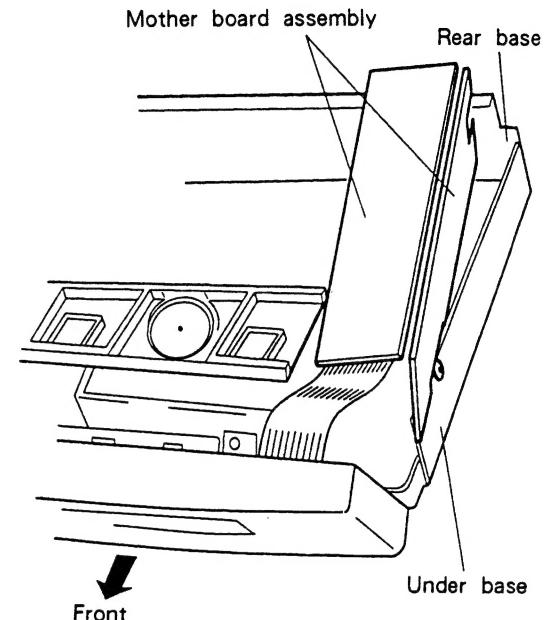


Fig. 2 - 5.

2.6 INSTALLING THE CLAMP CAM

- ① While pushing down the lever switch on the loading base towards the transformer board assembly, install the clamp cam.

2.7 INSTALLING THE FLOAT BASE

- ① Rotate the clamp cam in the counterclockwise direction fully, and install the float base. For details on rotating the clamp cam, refer to '2.3 Removing the Float Base'.

2.8 INSTALLING THE TRAY

- ① Rotate the driving gear in the counterclockwise direction, and lower the servo mechanism assembly to the maximum.
- ② Rotate the driving gear in the counterclockwise direction, and adjust the ▽ mark of the driving gear (on the round hole) to the ▲ mark of the loading base.
- ③ Insert the tray.

Note 1: If the servo mechanism assembly does not descend even if the driving gear is rotated, it means that the gears are not engaged.

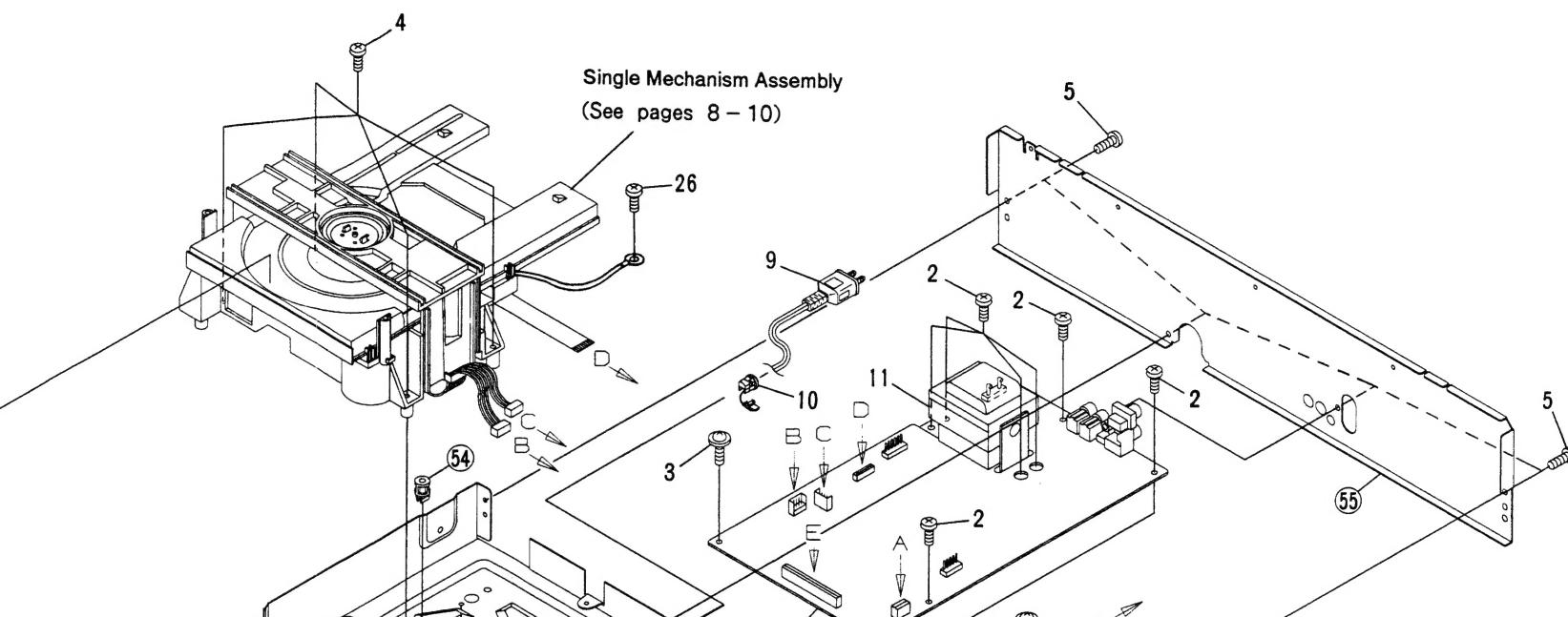
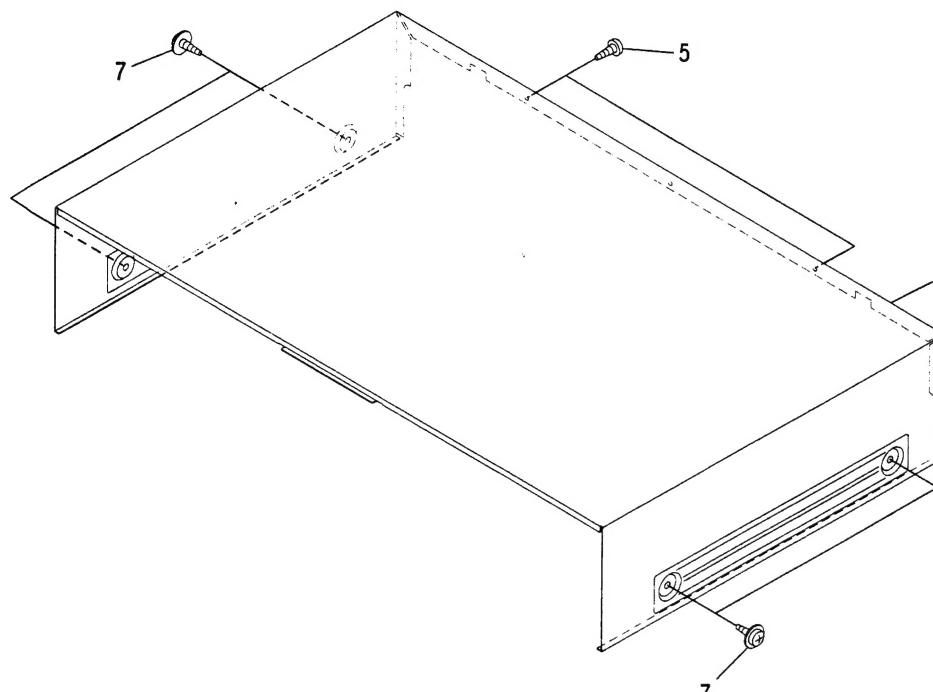
In this case, perform ②, and rotate the driving gear once again.

Note 2: The servo mechanism assembly will not rise fully even if the tray is inserted completely. However, it rises to the maximum automatically when the power is supplied.

3. EXPLODED VIEWS, PACKING AND PARTS LIST

3.1 EXTERIOR

A



A

B

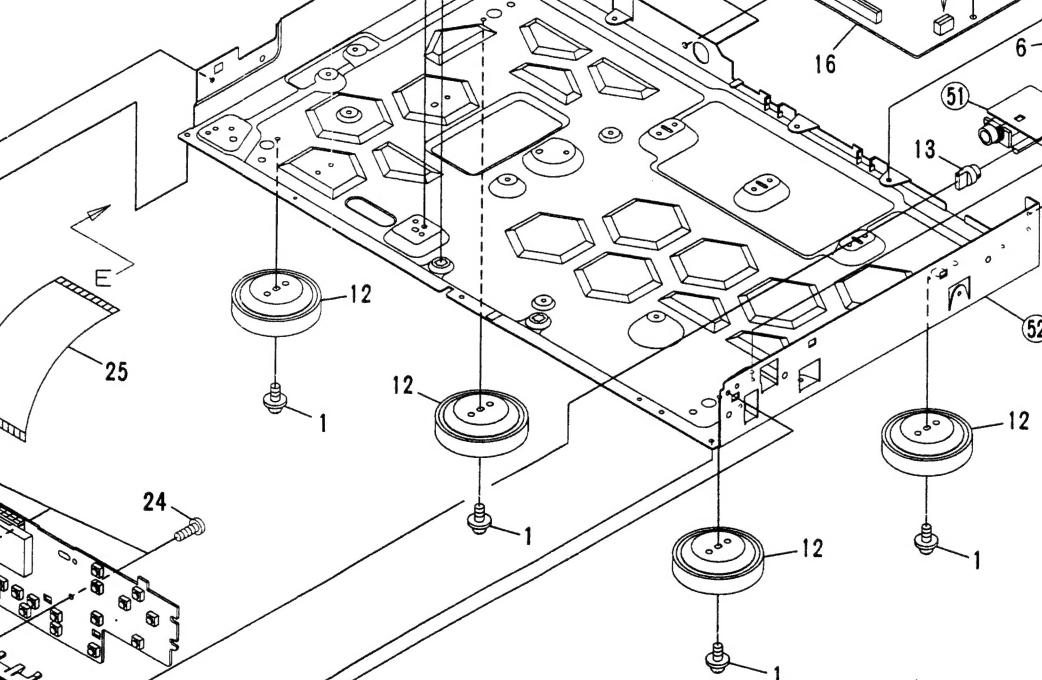
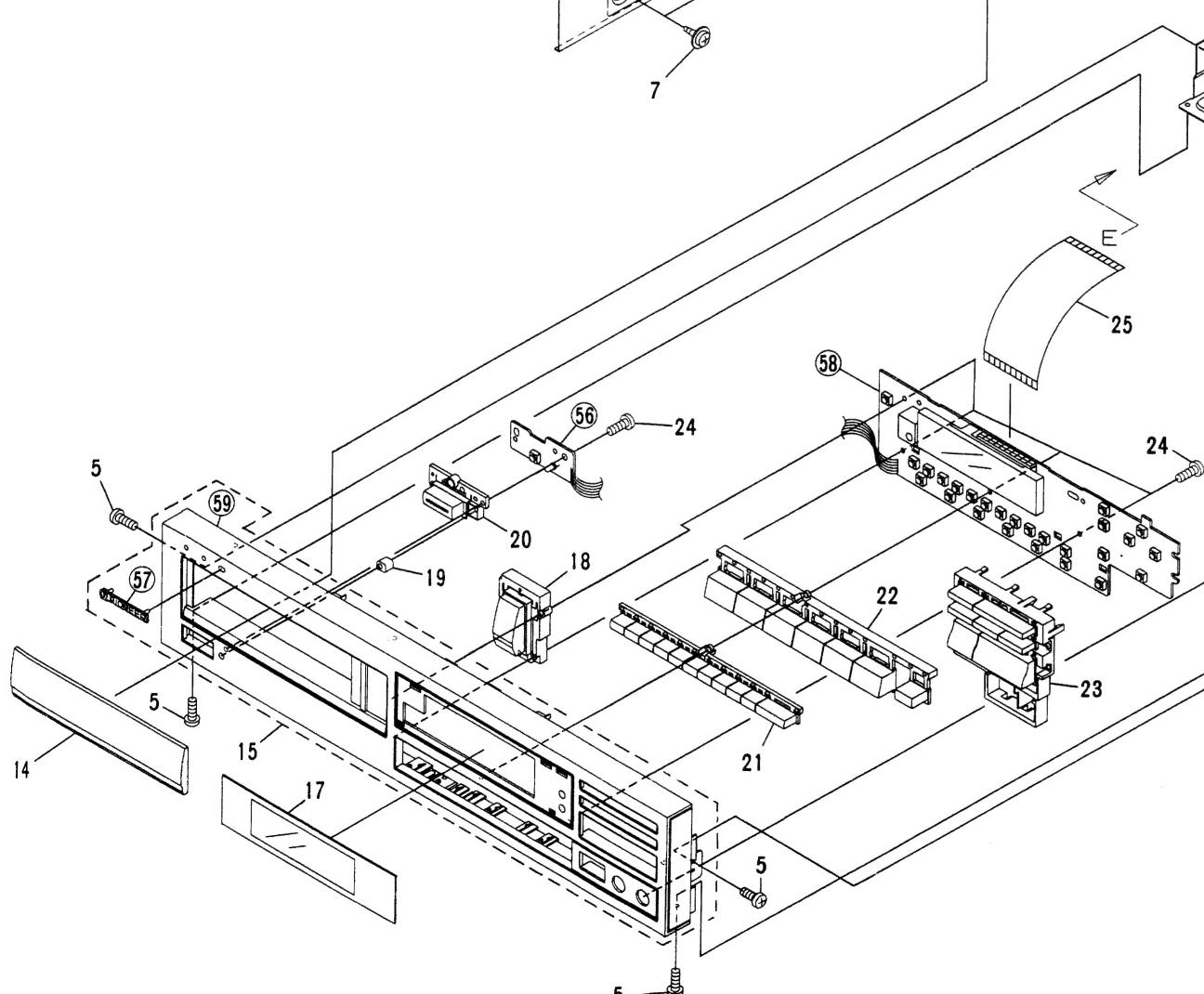
B

C

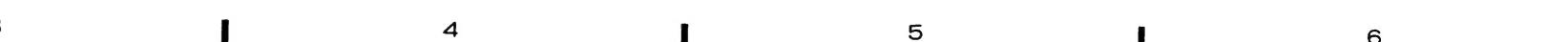
C

D

D



E



5

6

NOTES:

- The parts with an encircled number are generally unavailable because they are not in our Master Spare Parts List.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by “ \odot ” are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

Parts List

| Mark | No. | Description | Part No. |
|-------------|------------|-------------------------|-----------------|
| | 1 | Screw | IBZ30P100FCC |
| | 2 | Screw | BBZ30P060FMC |
| | 3 | Screw | IBZ30P150FCC |
| | 4 | Screw | BBZ30P160FMC |
| | 5 | Screw | BBZ30P080FZK |
| | 6 | Screw | IBZ30P080FCC |
| | 7 | Screw | FBT40P080FZK |
| | 8 | Bonnet | PYY1147 |
| Δ | 9 | AC power cord | PDG1040 |
| Δ | 10 | Strain relief | CM - 22 |
| Δ | 11 | Power transformer | PTT1235 |
| | 12 | Insulator (ABS) | PNW1912 |
| | 13 | Headphone knob | PAC1370 |
| | 14 | Tray name plate (ABS) | PNW2134 |
| | 15 | Function panel assembly | PEA1191 |
| \odot | 16 | Mother board assembly | PWM1657 |
| | 17 | Display window B | PAM1543 |
| | 18 | O/C button (ABS) | PAC1688 |
| | 19 | LED lens (ABS) | PNW2019 |
| | 20 | Power button (ABS) | PAC1540 |
| | 21 | 10 key A (ABS) | PAC1635 |
| | 22 | Program button | PAC1636 |
| | 23 | Play button A | PAC1633 |
| | 24 | Screw | PPZ30P120FMC |
| | 25 | 32P F.F.C./30V | PDD1041 |
| | 26 | Screw | PDZ30P050FMC |
| | 51 | Headphone PCB assembly | PWZ2298 |
| | 52 | Under base | PNA1732 |
| | 53 | ..... |  |
| | 54 | PCB spacer | PNY - 404 |
| | 55 | Rear base | PNA1726 |
| | 56 | SW PCB assembly | PWZ2294 |
| | 57 | PIONEER badge | PAM1407 |
| | 58 | Function board assembly | PWZ2284 |
| | 59 | Function Panel C | PNW2195 |

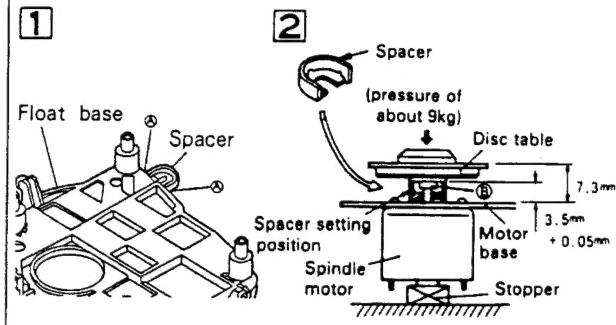
3.2 MECANISM SECTION

Parts List

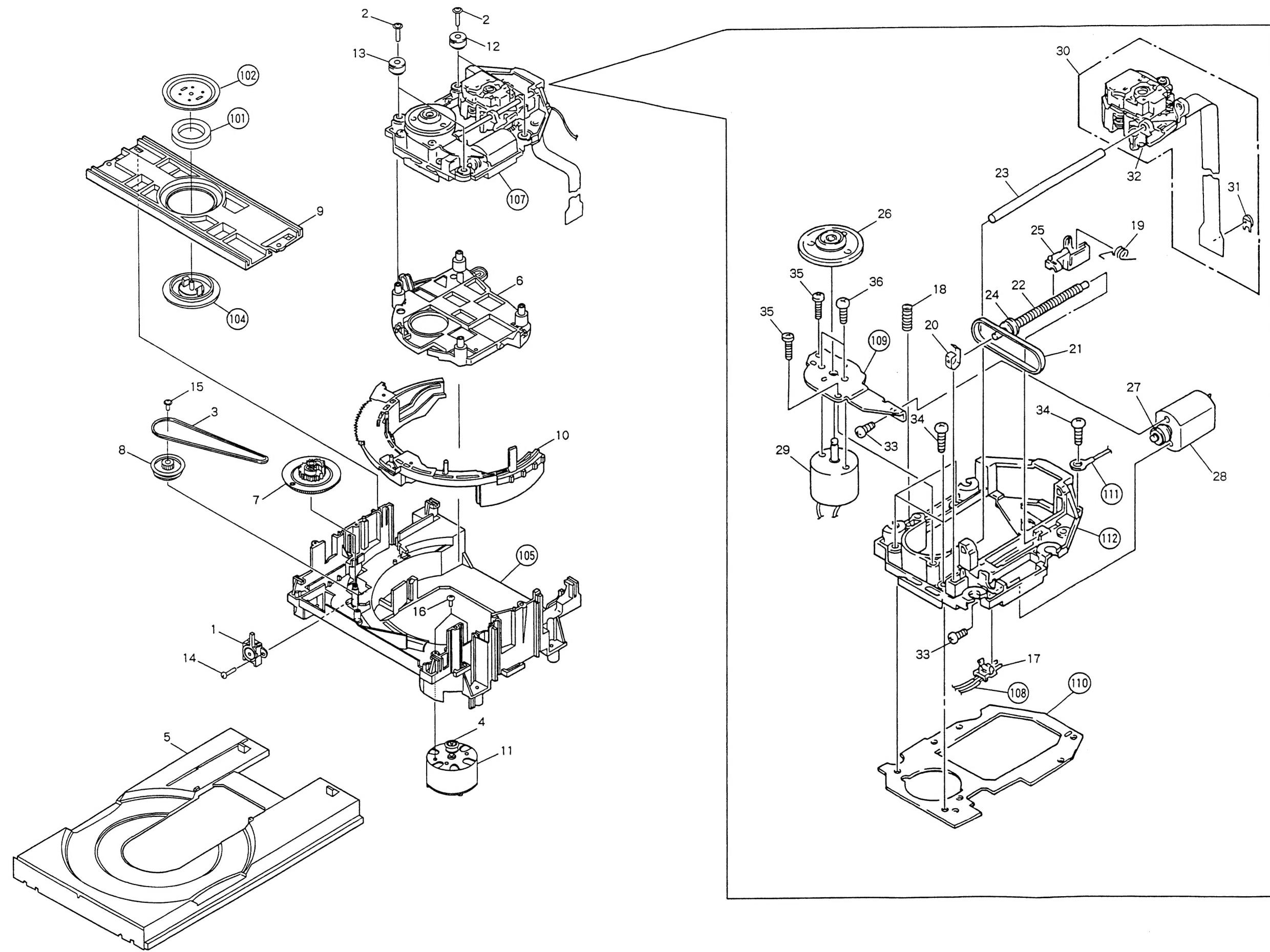
| Mark | No. | Description | Part No. | Mark | No. | Description | Part No. |
|------|---|--------------|----------|------|-----------------------------------|-------------|----------|
| 1 | Lever switch (CLAMP) | DSK1003 | | 101 | Clamp magnet | PMF1014 | |
| 2 | Screw | PBA1048 | | 102 | Yoke | PNB1216 | |
| 3 | Rubber belt | PEB1193 | | 103 | ..... |  |  |
| 4 | Motor pulley | PNW1634 | | 104 | Clamper S | PNW1609 | |
| 5 | Tray | PNW2031 | | 105 | Loading base | PNW2030 | |
| 6 | Floating base | PNW2032 | | 106 | ..... |  |  |
| 7 | Drive gear | PNW2033 | | 107 | Servo mechanism assembly | PXA1406 | |
| 8 | Gear pulley | PNW2034 | | 108 | 2mm pitch connector assembly (5P) | PDE1169 | |
| 9 | Clamper base | PNW2035 | | 109 | Motor base | PNB1211 | |
| 10 | Clamp cam | PNW2036 | | 110 | Mechanism base | PNB1230 | |
| 11 | DC motor (0.75W) (LOADING) | PXM1010 | | 111 | Earth lead unit | PDF1074 | |
| 12 | Floating rubber | PEB1014 | | 112 | Mechanism chassis | PNW1604 | |
| 13 | Floating rubber | PEB1132 | | | | | |
| 14 | Screw | BPZ26P080FMC | | | | | |
| 15 | Screw | Z39 - 018 | | | | | |
| 16 | Screw | PMZ26P040FMC | | | | | |
| 17 | Push switch (INSIDE) | DSG1014 | | | | | |
| 18 | Earth spring | PBH1084 | | | | | |
| 19 | Drive spring | PBH1009 | | | | | |
| 20 | Plate spring | PBK1057 | | | | | |
| 21 | Belt | PEB1072 | | | | | |
| 22 | Drive screw | PLA1003 | | | | | |
| 23 | Guide bar | PLA1071 | | | | | |
| 24 | Pulley | PNW1066 | | | | | |
| 25 | Half nut | PNW1605 | | | | | |
| 26 | Disc table | PNW1608 | | | | | |
| 27 | Motor pulley | PNW1634 | | | | | |
| 28 | DC motor (1.7W) (CARRIAGE) | PXM1013 | | | | | |
| 29 | DC motor assembly (SPINDLE) (with oil) | PEA1028 | | | | | |
| 30 | Pickup assembly | PEA1030 | | | | | |
| 31 | Variable resistor (VR1) (3.3k Ω) | PCP1008 | | | | | |
| 32 | Chip capacitor (1/16V) | CKSYF105Z16 | | | | | |
| 33 | Screw | PMZ20P030FMC | | | | | |
| 34 | Screw | PBZ30P080FMC | | | | | |
| 35 | Screw | BPZ20P080FMC | | | | | |
| 36 | Screw | JFZ20P025FMC | | | | | |

• How to install the disc table

- 1 Use nippers or other tool to cut the two sections marked Ⓐ in figure 1. Then remove the spacer.
- 2 While supporting the spindle motor shaft with the stopper, put spacer on top of the motor base (angled so it doesn't touch section Ⓑ), and stick the disc table on top (takes about 9kg pressure). Take off the spacer.



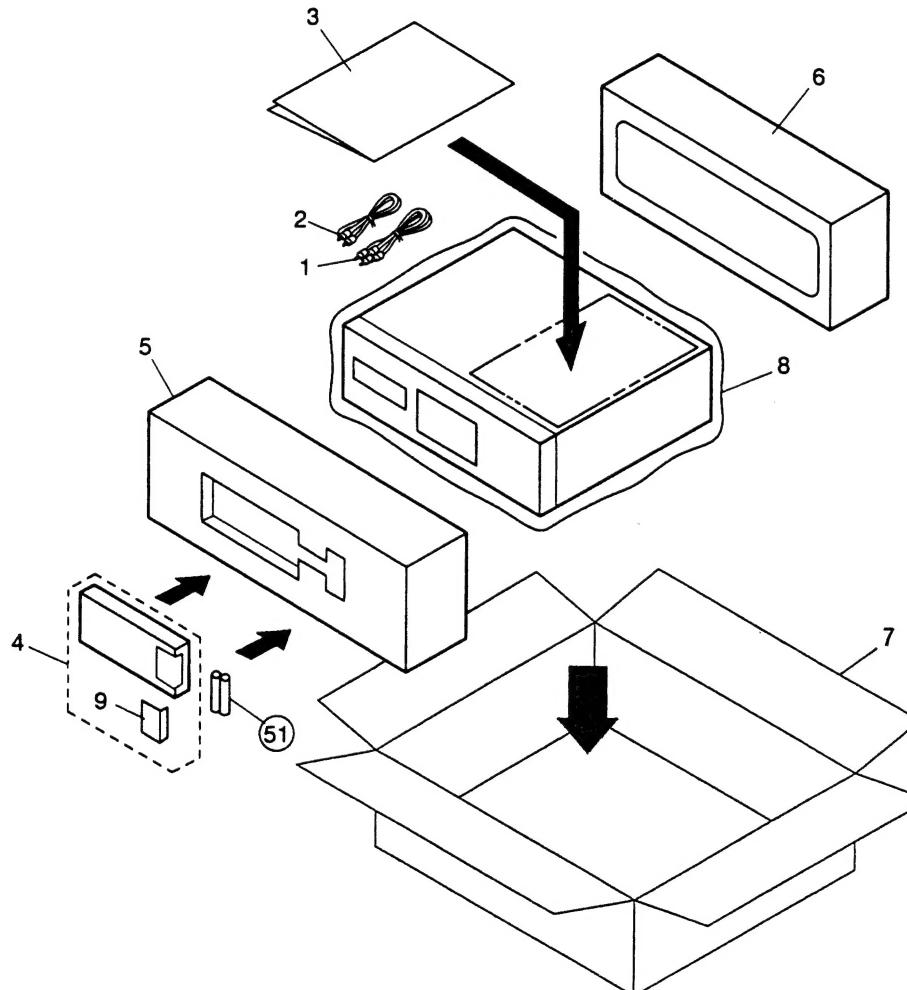
Mechanism Section



3.3 PACKING

Parts List

| Mark No. | Description | Part No. |
|----------|-------------------------------------|-----------|
| 1 | Connection cord with mini plug | PDE - 319 |
| 2 | Connection cord with pin plug | PDE1109 |
| 3 | Operating instructions (English) | PRB1159 |
| 4 | Remote control unit | PWW1061 |
| 5 | Protector F | PHA1116 |
| 6 | Protector R | PHA1117 |
| 7 | CD packing case | PHG1748 |
| 8 | Sheet | Z23 - 007 |
| 9 | Battery cover | PZN1010 |
| 51 | Dry cell battery (UM - 4) VEM - 022 | |



4. PCB CONNECTION AND SCHEMATIC DIAGRAM

1. RESISTORS :

Indicated in Ω , $1/4W$, $1/6W$, $1/8W$, $\pm 5\%$ tolerance unless otherwise noted k ; $k\Omega$, M ; $M\Omega$, (F); $\pm 1\%$, (G); $\pm 2\%$, (K); $\pm 10\%$, (M); $\pm 20\%$ tolerance.

2. CAPACITORS :

Indicated in capacity (μF) / voltage (V) unless otherwise noted p ; pF . Indication without voltage is 50V except electrolytic capacitor.

3. VOLTAGE CURRENT :

⎓ ; DC voltage (V) at play state.

⎓mA ; DC current at play state.

⎓ ; Value in () is DC current at stop state.

4. OTHERS :

→ ; Signal route.

◎ ; Adjusting point.

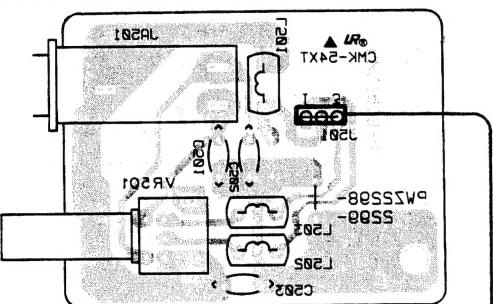
The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.

* marked capacitors and resistors have parts numbers.

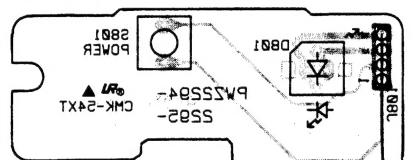
This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.

51

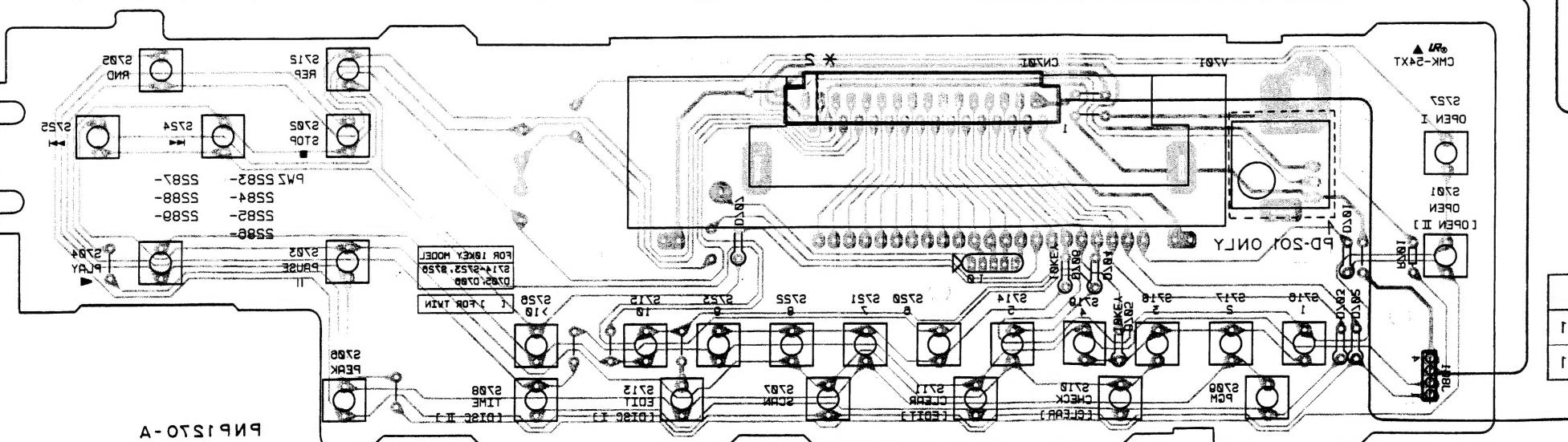
HEADPHONE BOARD ASSEMBLY



SWITCH BOARD ASSEMBLY



FUNCTION BOARD ASSEMBLY



A-02519N9

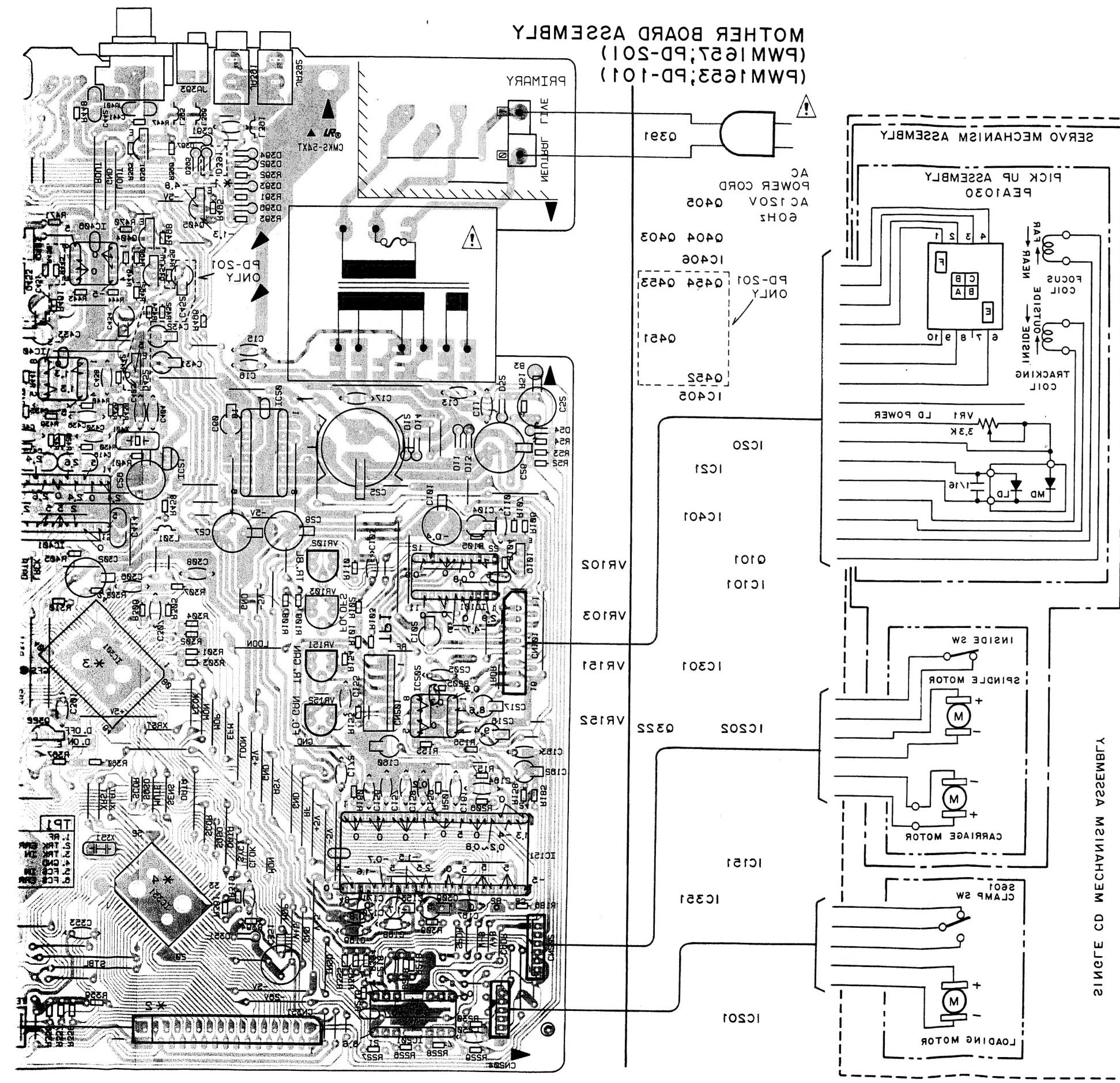
1C351 (PDA364A)

| Volts | pin No. | Volts | pin No. | Volts | pin No. | Volts | pin No. | Volts | pin No. |
|-------|----------|-------|-----------|-------|-----------|-------|---------|-------|---------|
| 0 | 2.0 | 33 | 2.0 | 33 | -2.1~+2.3 | 2.0 | 49 | 2.0 | 49 |
| 1 | 2.0 | 12 | -2.1~+2.3 | 2.0 | 20 | 33 | +1.1 | 2.0 | 0 |
| 2 | NC | 18 | -2.6 | 0 | 34 | 33 | +1.1 | 2.0 | 0 |
| 3 | -SA~+SA3 | 19 | -2.0 | 0 | 35 | 2.0 | 21 | 0 | 0 |
| 4 | -SA~+SA3 | 20 | 1.5 | 0 | 36 | 2.5 | 25 | 2.0 | 0 |
| 5 | -SA~+SA3 | 21 | 1.1 | 0 | 37 | 2.0 | 23 | 2.0 | 0 |
| 6 | -SA~+SA3 | 22 | -0.0~+1.5 | 0 | 38 | 2.0 | 24 | 0 | 0 |
| 7 | -SA~+SA3 | 23 | 0.5~0.8 | 0 | 39 | 2.5 | 25 | 2.0 | 0 |
| 8 | -SA~+SA3 | 24 | 0.0~0.1 | 0 | 40 | 0 | 26 | 2.5 | 2.5 |
| 9 | -SA~+SA3 | 25 | 0 | 41 | NC | 2.5 | 2.5 | 2.0 | 0 |
| 10 | -SA~+SA3 | 26 | NC | 42 | NC | 2.8 | 0 | 0 | 0 |
| 11 | -SA~+SA3 | 27 | 0.5~0.8 | 0 | 43 | 2.0 | 29 | 0 | 0 |
| 12 | -SA~+SA3 | 28 | -0.5~+0.3 | 0 | 44 | 2.0 | 60 | NC | 0 |
| 13 | 2.0 | 28 | -0.5~+0.3 | 0 | 45 | 2.0 | 60 | 2.0 | 0 |
| 14 | 0 | 29 | -1.1~+1.3 | 0 | 46 | 2.0 | 62 | 0 | 0 |
| 15 | NC | 31 | 0 | 47 | 2.0 | 63 | 0 | 0 | 0 |
| 16 | -SA.8 | 32 | 2.0 | 48 | 2.1~+3.0 | 2.0 | 64 | 0 | 0 |

IC301 (CXD2500A)

| No. | Volts | pin No. | Volts | pin No. | Volts | pin No. | Volts | pin No. | Volts | pin No. | Volts | pin No. |
|-----|-------|---------|-----------|---------|-------|---------|-------|---------|-------|---------|-------|---------|
| 1 | .5 | 0 | .51 | 0 | .41 | NC | .61 | NC | .41 | 0 | .5 | 0 |
| 2 | NC | .55 | .55 | .5 | .45 | .0 | .65 | NC | .5 | .55 | NC | .5 |
| 3 | .5 | 0 | .53 | .5 | .43 | NC | .63 | NC | .43 | 0 | .5 | 0 |
| 4 | NC | .54 | .44 | .5 | .44 | NC | .64 | NC | .44 | 0 | .5 | 0 |
| 5 | NC | .55 | .45 | .5 | .45 | NC | .65 | NC | .45 | 0 | .5 | 0 |
| 6 | .5 | 0 | .56 | .5 | .46 | NC | .66 | NC | .46 | 0 | .5 | 0 |
| 7 | NC | .53 | .43 | .5 | .43 | 0 | .63 | NC | .43 | 0 | .5 | 0 |
| 8 | NC | .58 | .48 | NC | .48 | 0 | .68 | 0 | .48 | 0 | .58 | NC |
| 9 | 0 | .59 | .49 | 0 | .49 | 0 | .69 | 0 | .49 | 0 | .59 | 0 |
| 10 | 0 | .30 | .20 | NC | .20 | 0 | .50 | NC | .20 | 0 | .30 | 0 |
| 11 | NC | .31 | .13 ~ .53 | NC | .21 | NC | .71 | NC | .21 | NC | .31 | NC |
| 12 | 0 | .35 | .25 | 0 | .25 | 0 | .55 | 0 | .25 | 0 | .35 | 0 |
| 13 | NC | .33 | .25 | 0 | .23 | .5 | .73 | NC | .23 | .5 | .33 | NC |
| 14 | NC | .34 | .25 | NC | .24 | NC | .74 | NC | .24 | NC | .34 | NC |
| 15 | NC | .35 | .25 | 0 | .25 | 0 | .55 | 0 | .25 | 0 | .35 | NC |
| 16 | NC | .36 | .26 | NC | .26 | 0 | .56 | NC | .26 | 0 | .36 | NC |
| 17 | 0 | .37 | .26 | NC | .26 | NC | .76 | 0 | .26 | NC | .37 | 0 |
| 18 | .5 | .5 | .38 | NC | .28 | NC | .78 | NC | .28 | NC | .38 | .5 |
| 19 | .5 | .4 | .39 | 0 | .29 | NC | .79 | 0 | .29 | NC | .39 | .4 |
| 20 | 0 | .5 | .40 | NC | .60 | NC | .80 | NC | .60 | NC | .40 | .5 |

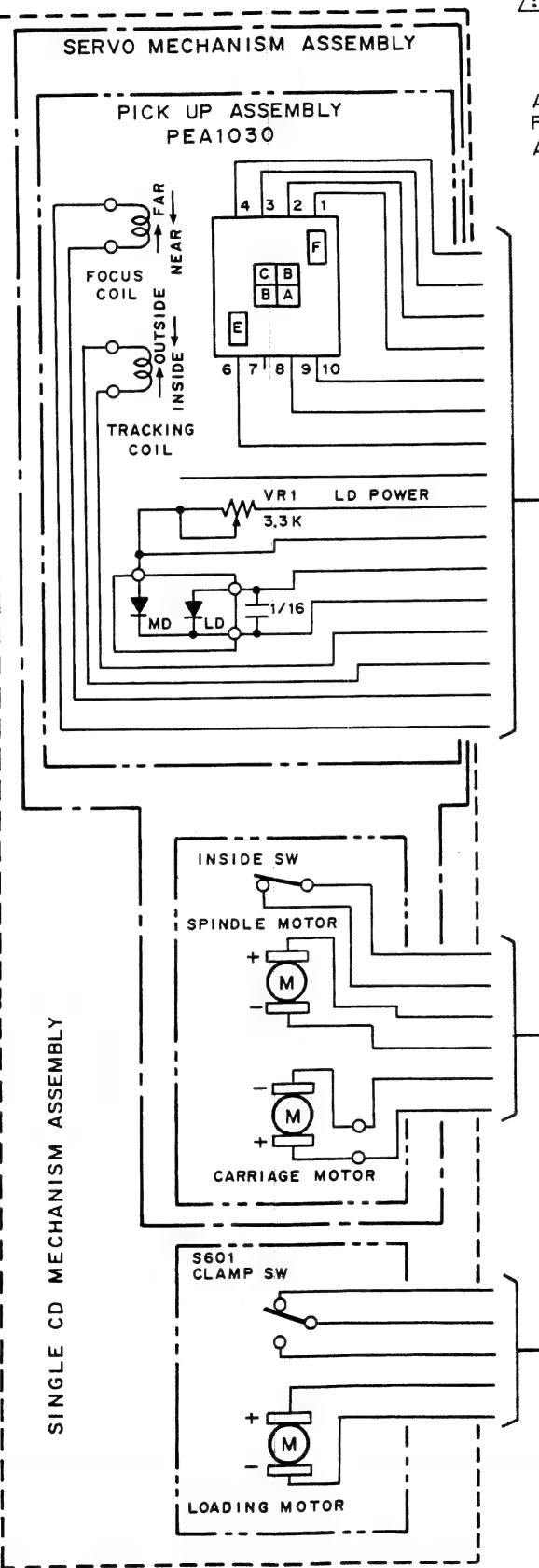
- View from soldering side



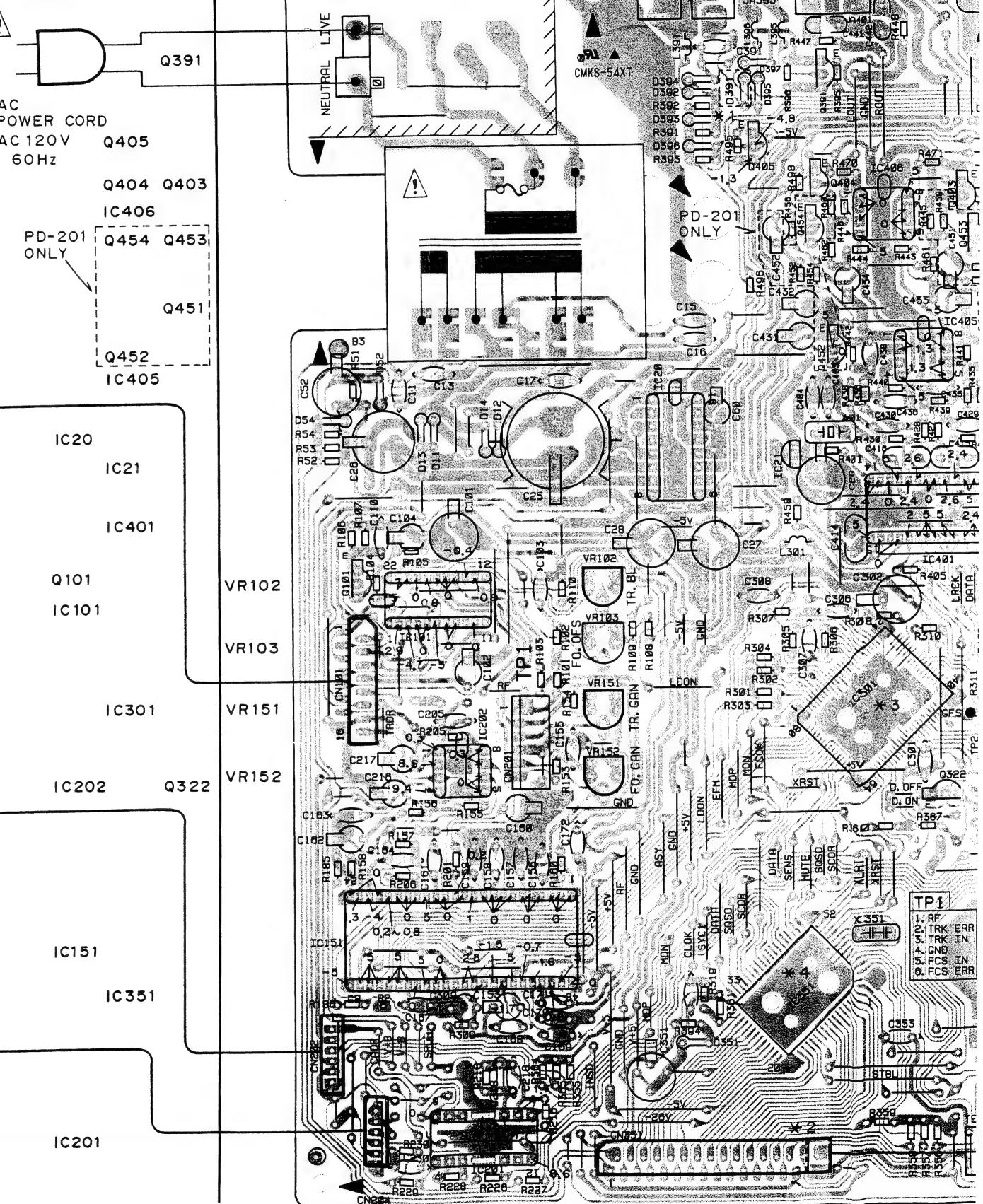
- View from component side

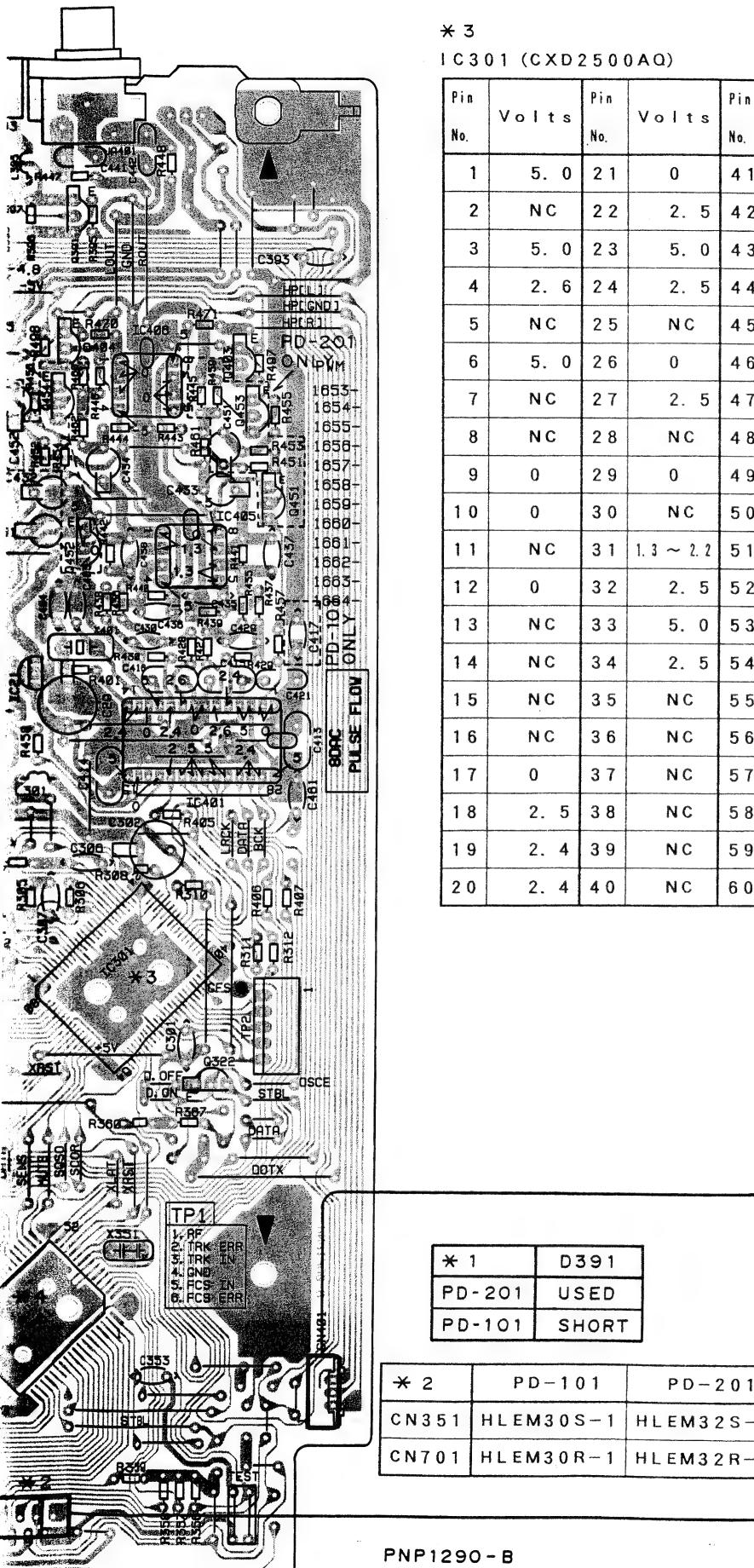
| P.C.B. pattern diagram indication | Corresponding part symbol | Part name | P.C.B. pattern diagram indication | Corresponding part symbol | Part name |
|-----------------------------------|---------------------------|-------------|-----------------------------------|---------------------------|--|
| | | Transistor | | | Ceramic capacitor |
| | | FET | | | Mylar capacitor |
| | | Diode | | | Styrol capacitor |
| | | Zener diode | | | Electrolytic capacitor (Non polarized) |
| | | LED | | | Electrolytic capacitor (Noiseless) |
| | | Varactor | | | Electrolytic capacitor (Polarized) |
| | | Tact switch | | | Power capacitor |
| | | Inductor | | | Semi-fixed resistor |
| | | Coil | | | Resistor array |
| | | Transformer | | | Resistor |
| | | Filter | | | Resonator |

- This P.C.B. connection diagram is viewed from the parts mounted side.
- The parts which have been mounted on the board can be replaced with those shown with the corresponding wiring symbols listed in the above Table.
- The capacitor terminal marked with shows negative terminal.
- The diode marked with shows cathode side.
- The transistor terminal marked with shows emitter.



MOTHER BOARD ASSEMBLY (PWM1657;PD-201) (PWM1653;PD-101)

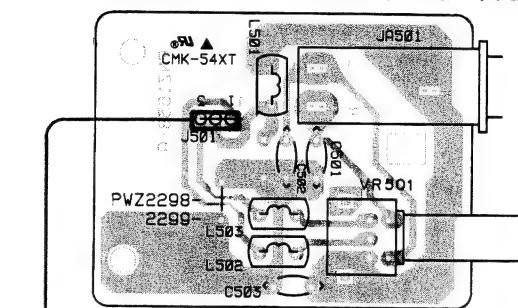




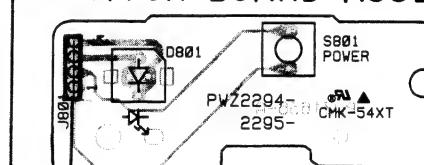
*** 4**
IC351 (PD4394A)

| Pin No. | Volts | Pin No. | Volts | Pin No. | Volts | Pin No. | Volts |
|---------|-------------|---------|---------------|---------|-----------|---------|-------|
| 1 | 5.0 | 17 | -9.1 ~ -9.3 | 33 | 5.0 | 49 | 5.0 |
| 2 | NC | 18 | -26.0 | 34 | 3.3 ~ 4.1 | 50 | 5.0 |
| 3 | -24 ~ -24.3 | 19 | -5.0 | 35 | 5.0 | 51 | 0 |
| 4 | -24 ~ -24.3 | 20 | 1.2 | 36 | 0 | 52 | 5.0 |
| 5 | -24 ~ -24.3 | 21 | 1.1 | 37 | 5.0 | 53 | 5.0 |
| 6 | -24 ~ -24.3 | 22 | -9.0 ~ -12.0 | 38 | 5.0 | 54 | 0 |
| 7 | -24 ~ -24.3 | 23 | 0.2 ~ 0.8 | 39 | 0 | 55 | 5.0 |
| 8 | -24 ~ -24.3 | 24 | 0.6 ~ 1.1 | 40 | 0 | 56 | 2.5 |
| 9 | -24 ~ -24.3 | 25 | 0 | 41 | NC | 57 | 2.5 |
| 10 | -24 ~ -24.3 | 26 | NC | 42 | NC | 58 | 0 |
| 11 | -24 ~ -24.3 | 27 | 0.2 ~ 0.4 | 43 | 5.0 | 59 | 0 |
| 12 | 5.0 | 28 | -2.0 ~ -3.3 | 44 | 5.0 | 60 | NC |
| 13 | 5.0 | 29 | -14.0 ~ -17.0 | 45 | 0 | 61 | 0 |
| 14 | 0 | 30 | -11.5 ~ -17.3 | 46 | 5.0 | 62 | 0 |
| 15 | NC | 31 | 0 | 47 | 5.0 | 63 | 0 |
| 16 | -23.8 | 32 | 5.0 | 48 | 2.1 ~ 3.0 | 64 | 0 |

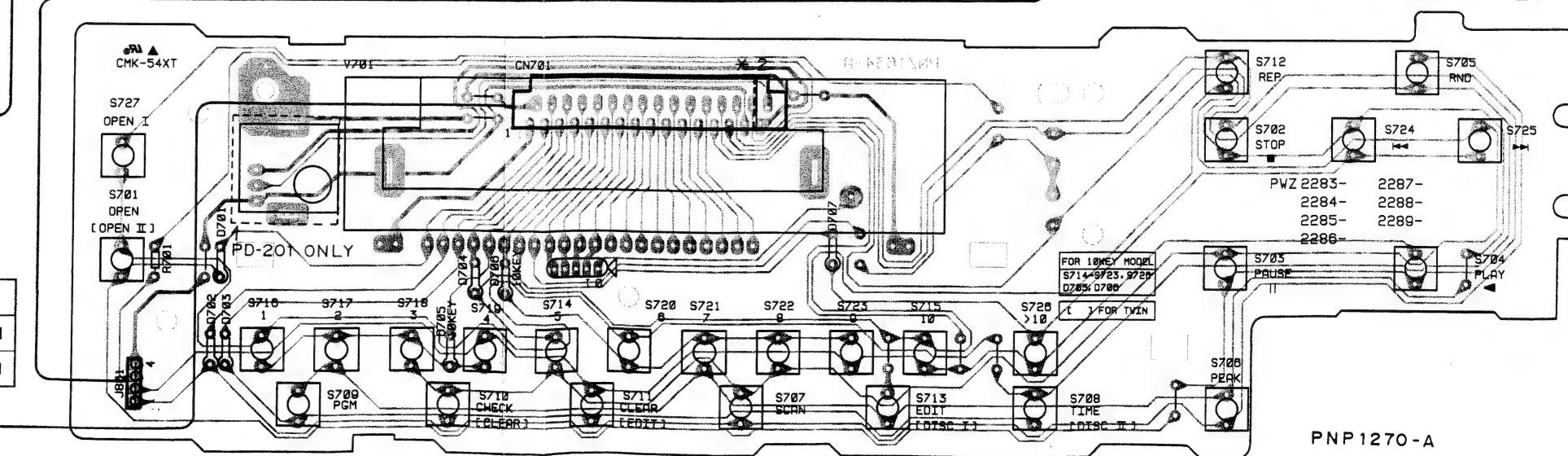
HEADPHONE BOARD ASSEMBLY

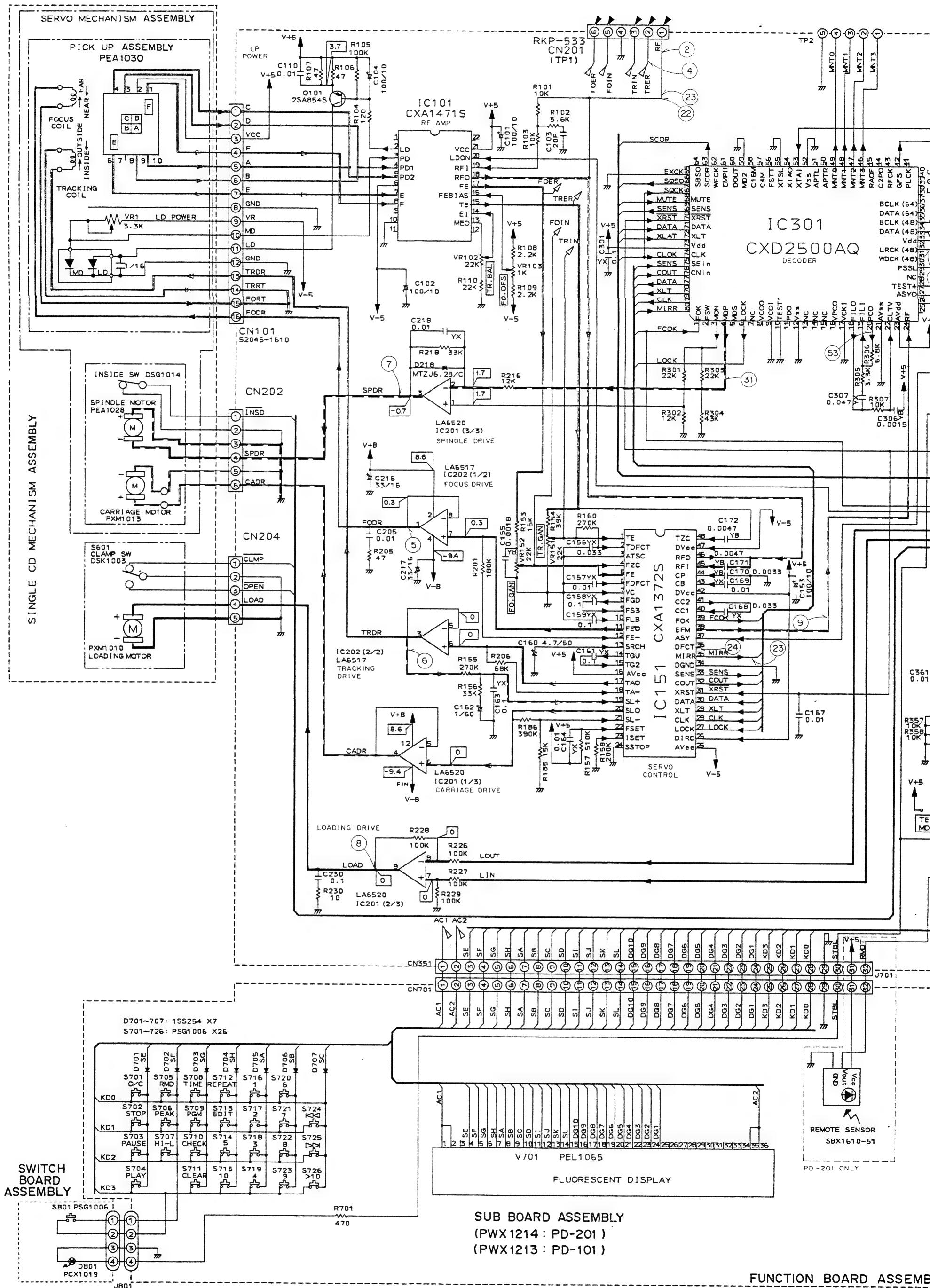


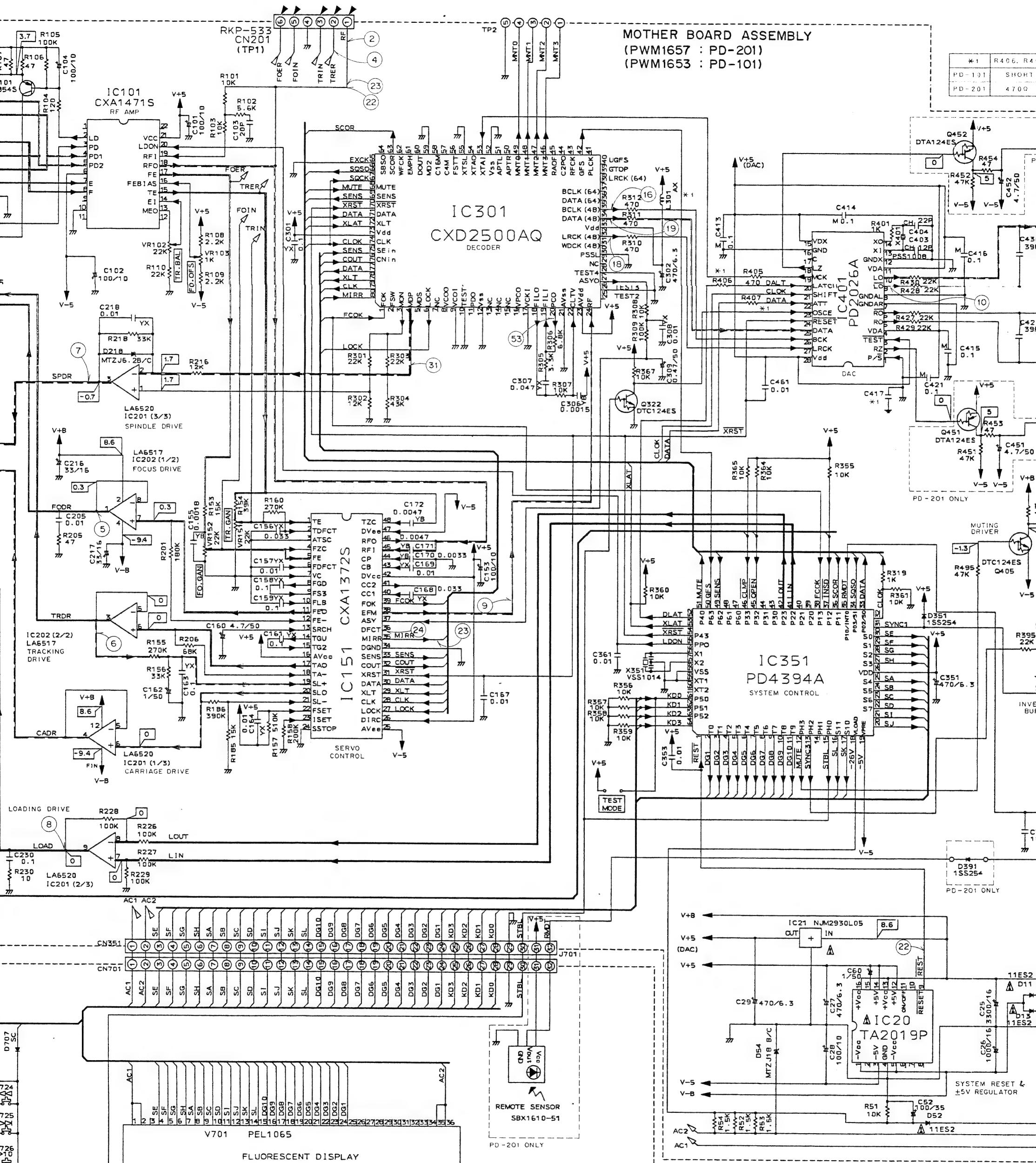
SWITCH BOARD ASSEMBLY



FUNCTION BOARD ASSEMBLY



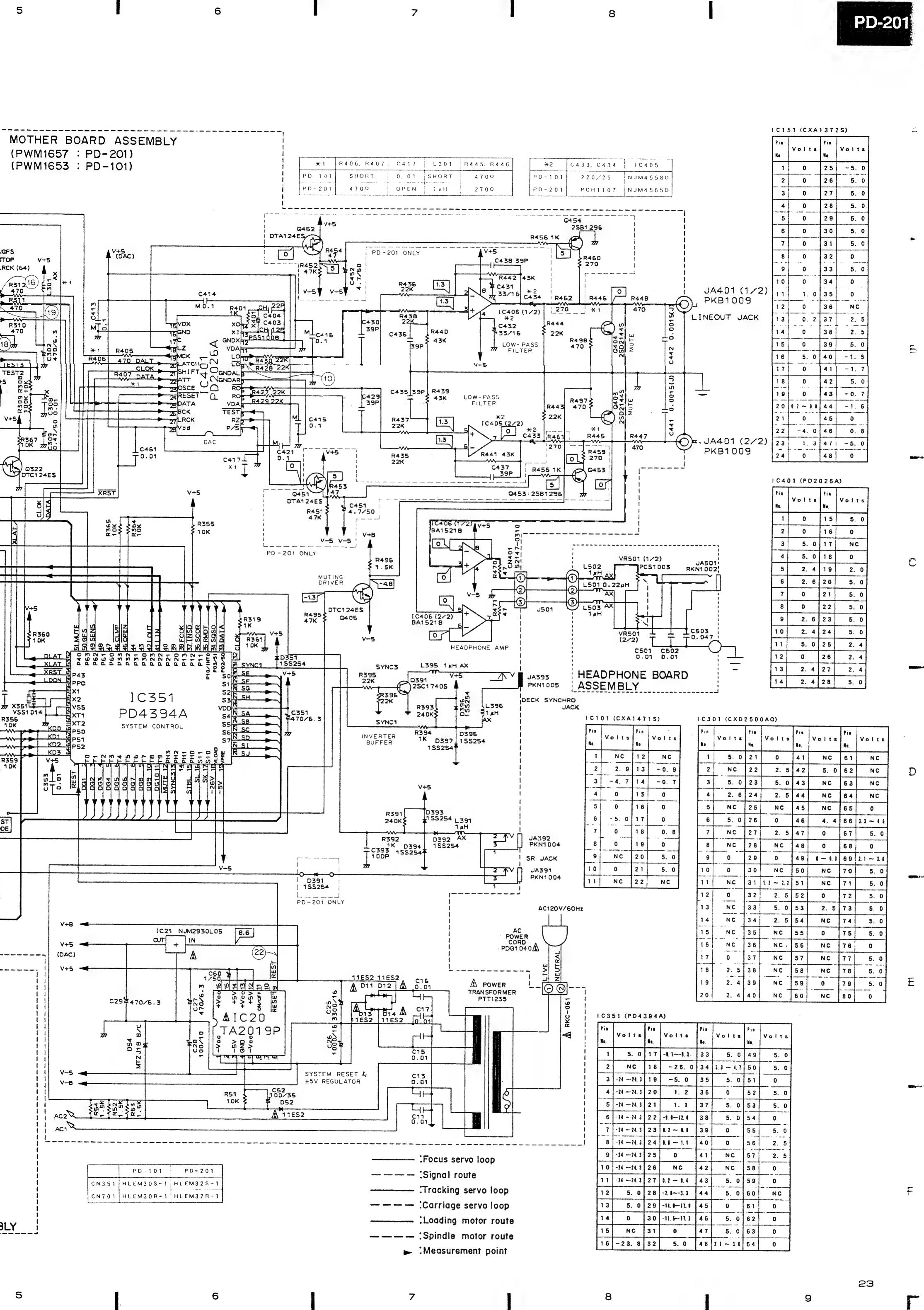


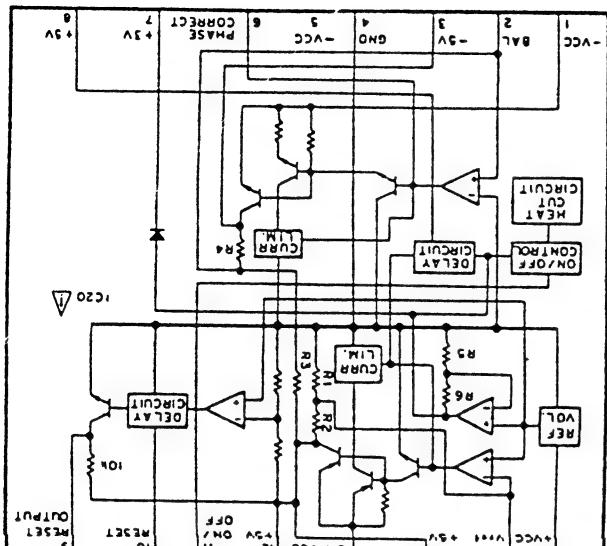


SUB BOARD ASSEMBLY
(PWX 1214 : PD-201)
(PWX 1213 : PD-101)

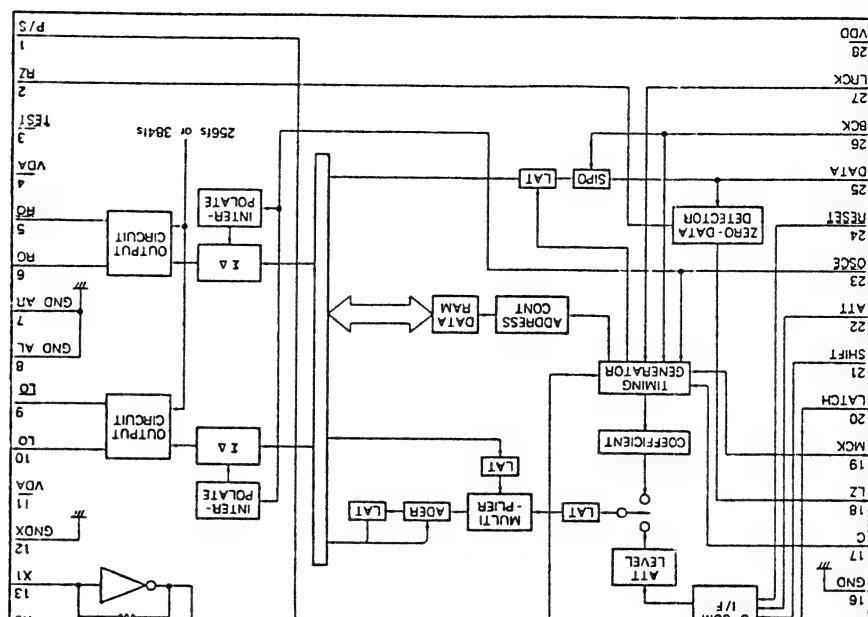
FUNCTION BOARD ASSEMBLY

| | PD-101 | PD-201 |
|-------|-----------|-----------|
| CN351 | HLEM30S-1 | HLEM32S-1 |
| CN701 | HLEM30R-1 | HLEM32R-1 |

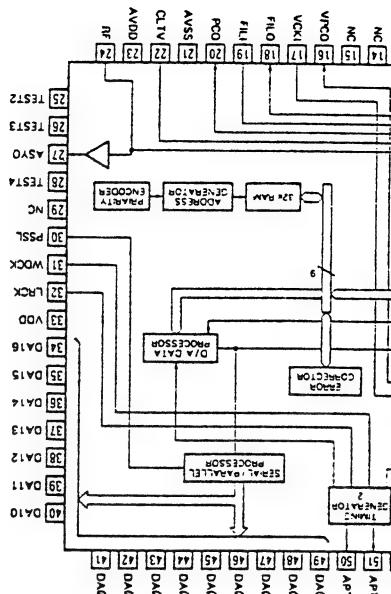




IC20-TA2019P



IC401-PD2026A

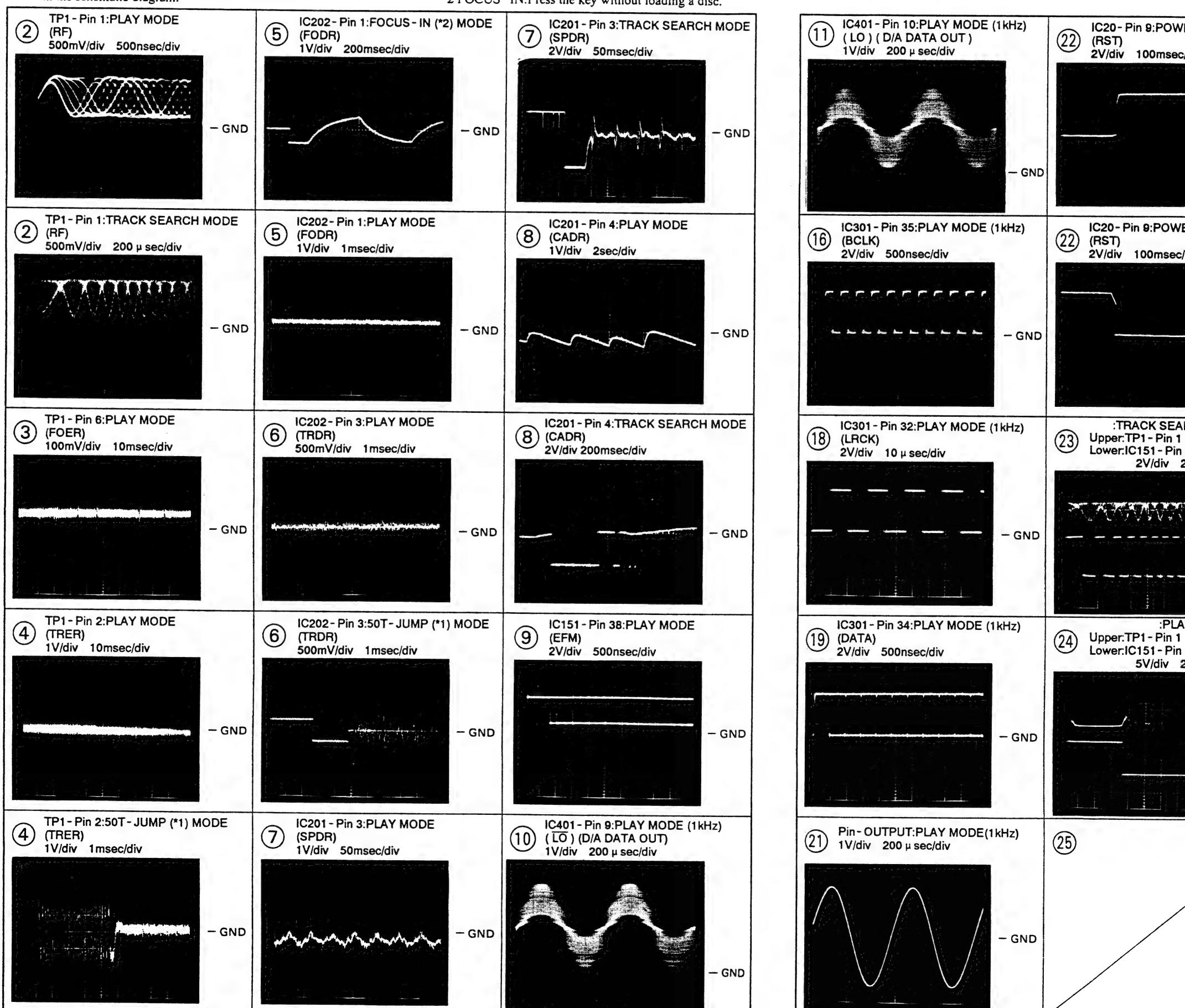


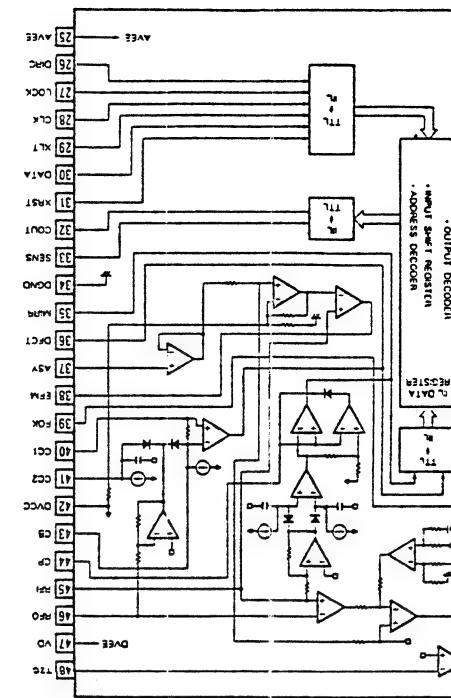
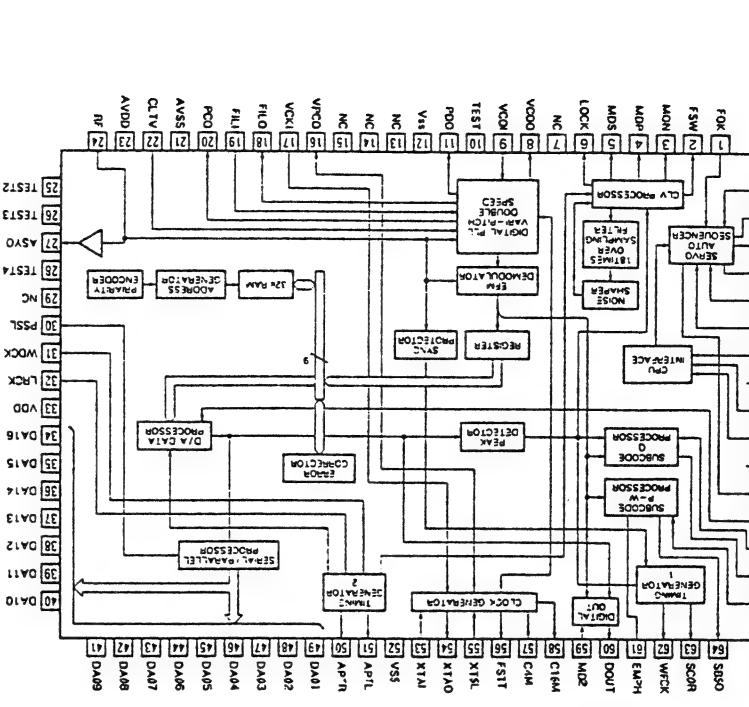
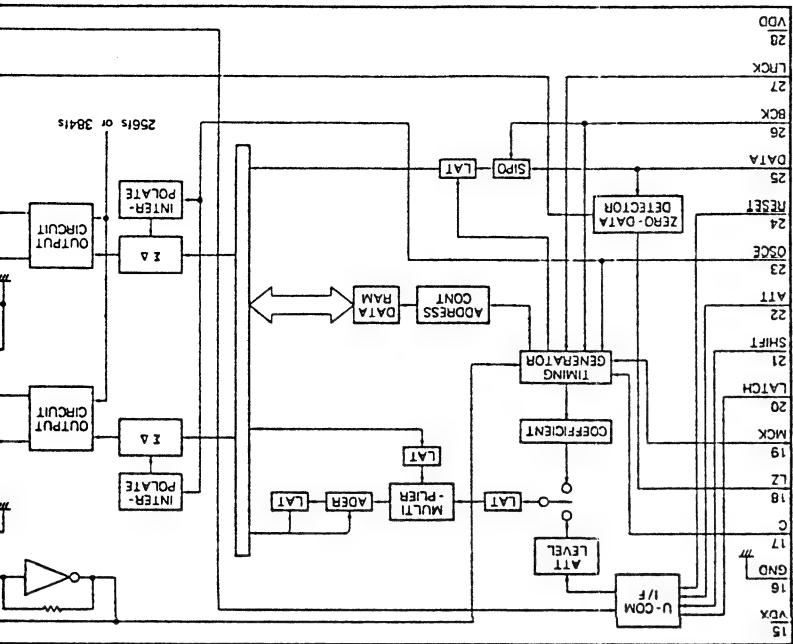
Wave Forms

Note: The encircled numbers denote measuring points in the schematic diagram.

*1 50T-JUMP: After switching to the pause mode, press the manual search key.

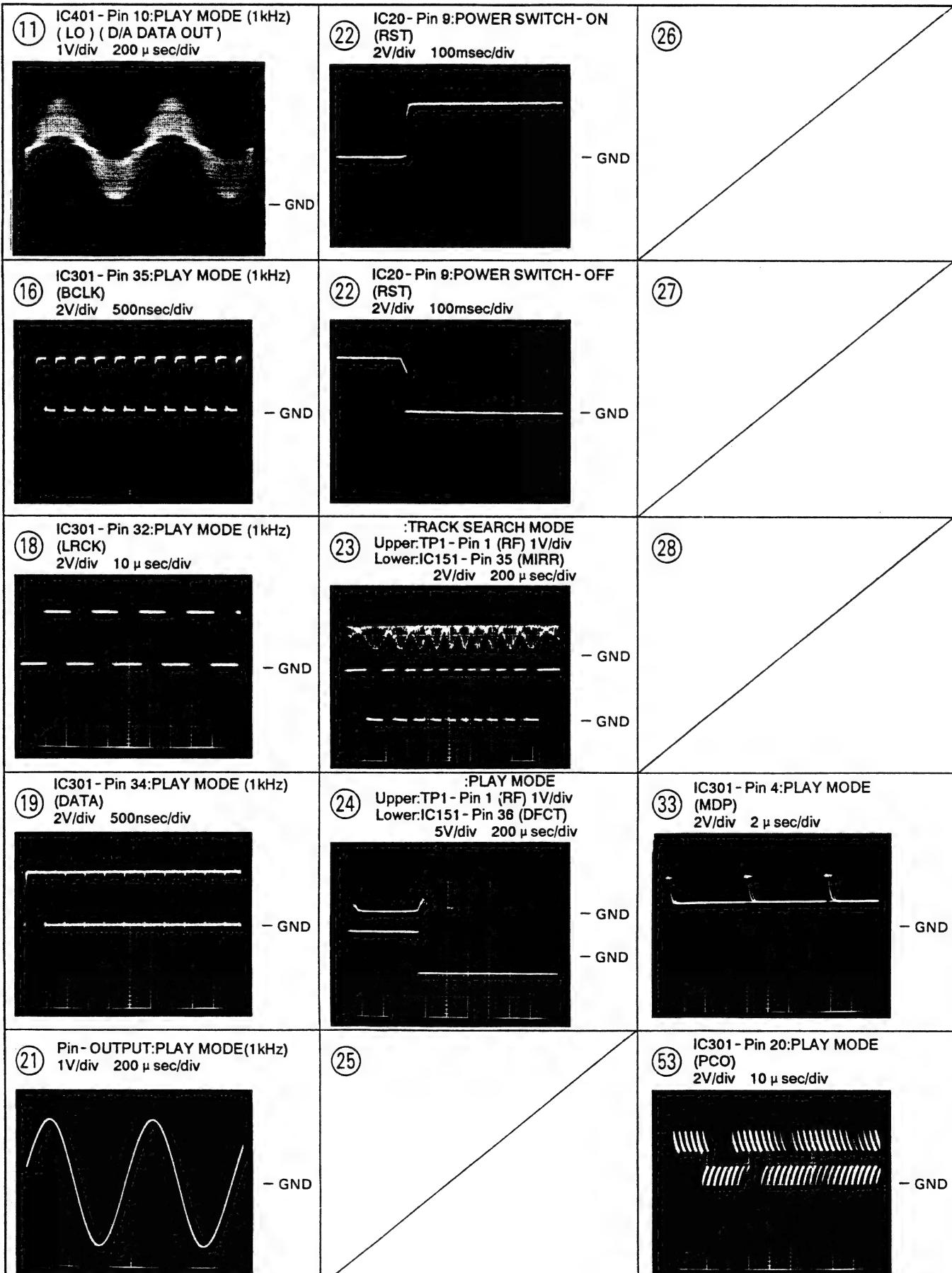
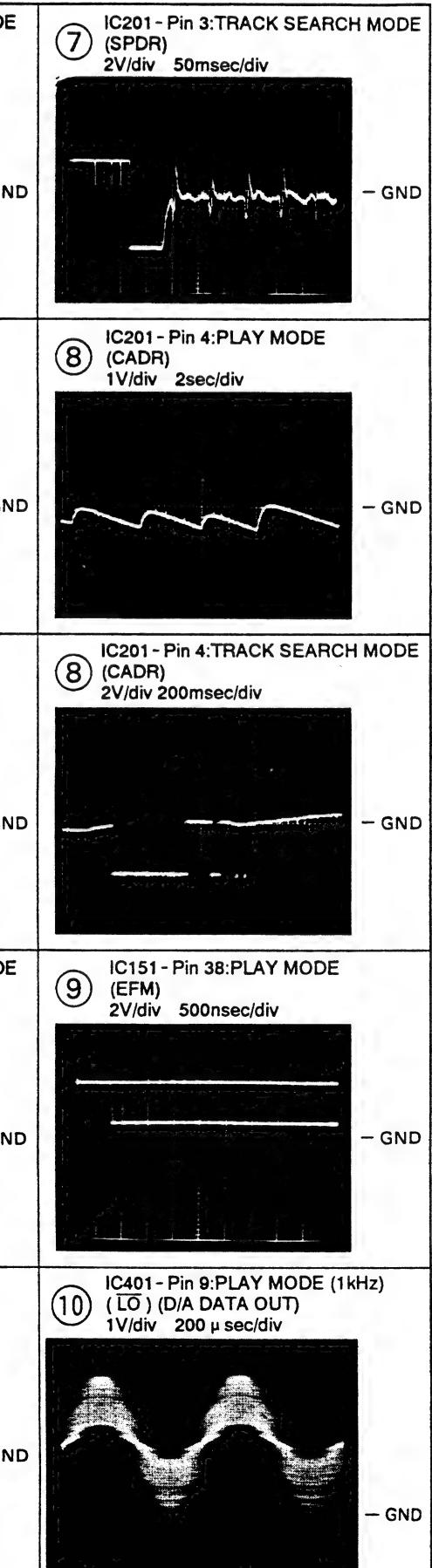
*2 FOCUS-IN: Press the key without loading a disc.





- JUMP: After switching to the pause mode, press the manual search key.

- US-IN: Press the key without loading a disc.



5. PCB

NOTES:

- Parts without part no.
- Parts marked by △
- The △ mark found to use parts of identical re.
- When ordering re.

Ex.1 When there
560 Ω →
47k Ω →
0.5 Ω →
1 Ω →
Ex.2 When there
5.62k Ω →

Mark No.

LIST OF ASSY

| | |
|---|---|
| ○ | MOTHER BOARD |
| ○ | SUB BOARD A \| FUNCTION \| SW PCB AS \| HEADPHONE |

● MOTHER B (PWM1657)

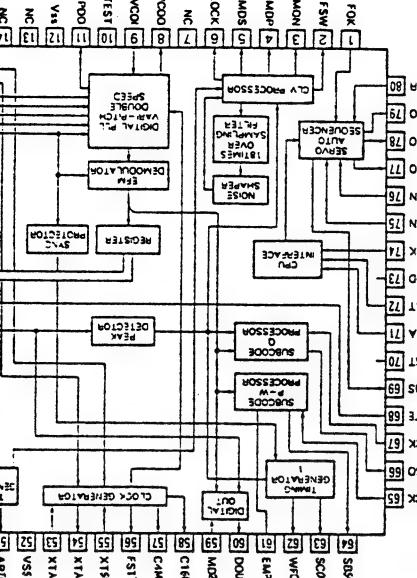
| | |
|---|---|
| △ | IC20 REGULATOR IC21 REGULATOR IC101 PRE AMP IC151 SERVO IC201 POWER |
|---|---|

| | |
|---|--|
| △ | IC202 POWER IC301 EFM D IC351 MICRO IC401 D/A C IC405 OP-AMP IC406 OP-AMP Q101 TRANSIS Q322 TRANSIS Q391 TRANSIS Q403, 404 TR |
|---|--|

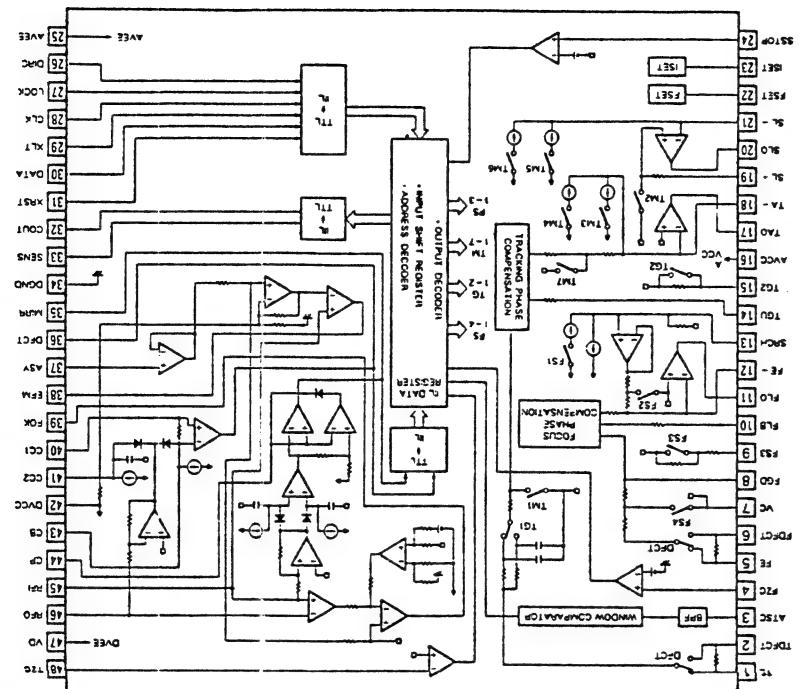
| | |
|---|---|
| △ | Q405 TRANSIS Q451, 452 TR Q453, 454 TR D11-14 DIODE D52 DIODE |
|---|---|

| | |
|---|---|
| △ | D54 ZENNER D218 ZENNER D351 DIODE D391-397 DIODE |
|---|---|

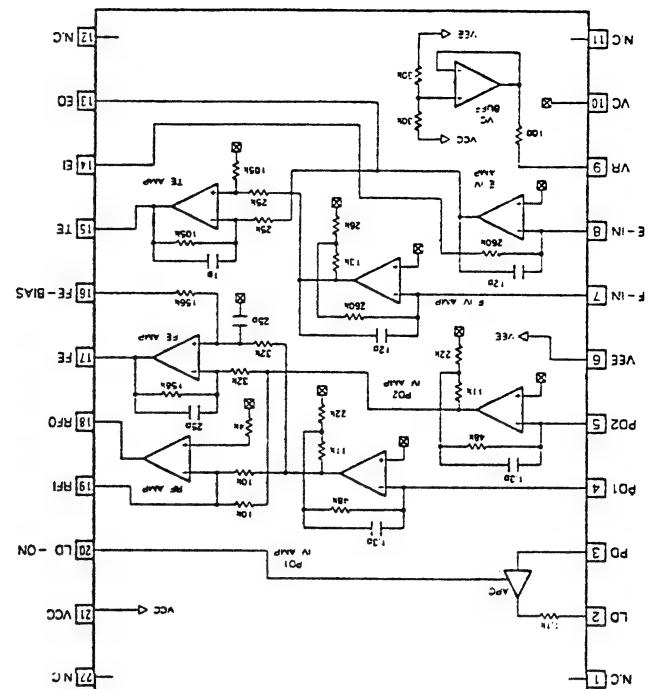
| | |
|---|---|
| ○ | COILS/TRANSFO L301 AXIAL L391 AXIAL L395, 396 AX |
|---|---|



IC301: CXD2500AQ

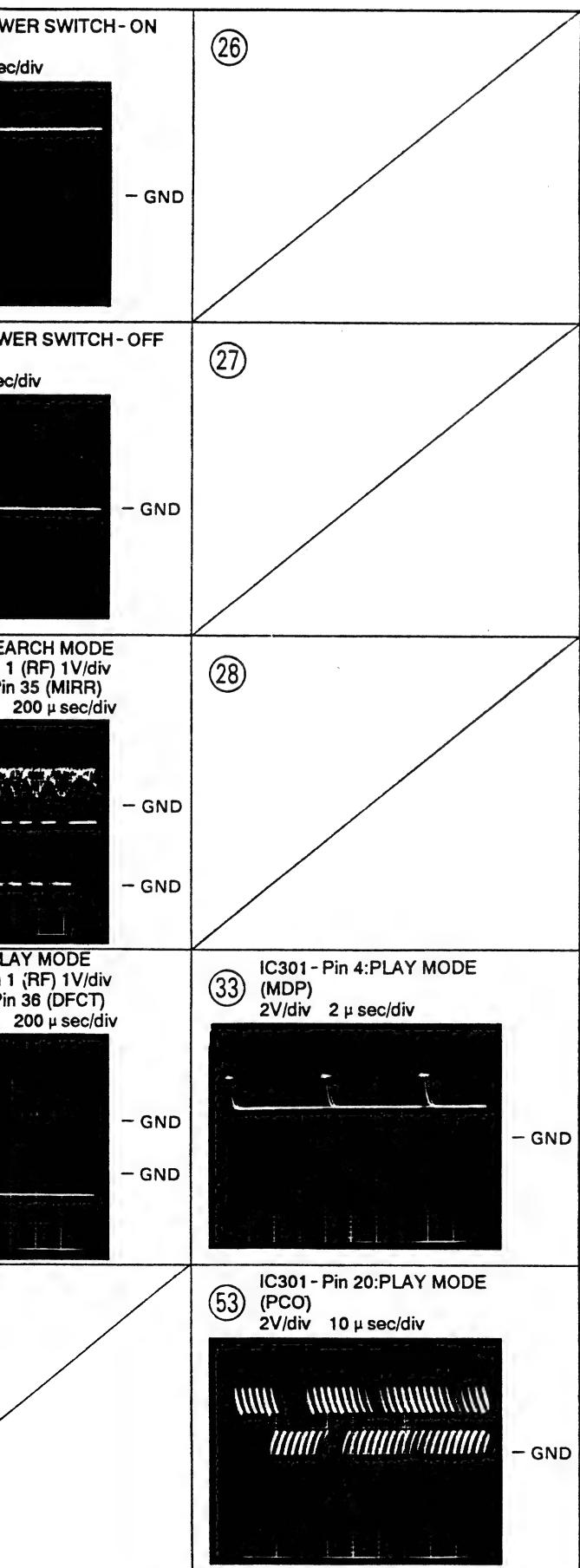


IC151: CXA1372S



IC101: CXA1471S

● IC BLOCK DIAGRAMS



5. PCB PARTS LIST

NOTES:

- Parts without part number cannot be supplied.
- Parts marked by "◎" are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.
- The △ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- When ordering resistors, first convert resistance values into code form as shown in the following examples.

Ex.1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%)

| | | |
|--------------|--|-----------------|
| 560Ω | $\rightarrow 56 \times 10^1 \rightarrow 561$ | RD1/4PS 5 6 1 J |
| $47k \Omega$ | $\rightarrow 47 \times 10^3 \rightarrow 473$ | RD1/4PS 4 7 3 J |
| 0.5Ω | $\rightarrow 0R5$ | RN2H 0 R 5 K |
| 1Ω | $\rightarrow 010$ | RS1P 0 1 0 K |

Ex.2 When there are 3 effective digits (such as in high precision metal film resistors).

| | | |
|----------------|--|-------------------|
| $5.62k \Omega$ | $\rightarrow 562 \times 10^1 \rightarrow 5621$ | RN1/4SR 5 6 2 1 F |
|----------------|--|-------------------|

| Mark | No. | Description | Part No. | Mark | No. | Description | Part No. |
|---------------------------|---------------------------|--|----------|-----------------------------|-----------------------------|--------------------------|-------------|
| LIST OF ASSEMBLIES | | | | | | | |
| ◎ | | MOTHER BOARD ASSEMBLY | PWM1657 | | | CAPACITORS | |
| ◎ | | SUB BOARD ASSEMBLY | PWX1214 | | | C11 CERAMIC CAPACITOR | CKCYF103Z50 |
| | | FUNCTION BOARD ASSEMBLY | | | | C13 CERAMIC CAPACITOR | CKCYF103Z50 |
| | | SW PCB ASSEMBLY | | | | C15-17 CERAMIC CAPACITOR | CKCYF103Z50 |
| | | HEADPHONE PCB ASSEMBLY | | | | C25 ELECTR. CAPACITOR | CEAS332M16 |
| | | | | | | C26 ELECTR. CAPACITOR | CEAS102M16 |
| ◎ | | MOTHER BOARD ASSEMBLY (PWM1657) | | | | C27 ELECTR. CAPACITOR | CEAS471M6R3 |
| SEMICONDUCTORS | | | | | | | |
| △ | IC20 REGULATOR IC | TA2019P | | | C28 ELECTR. CAPACITOR | CEAS101M10 | |
| △ | IC21 REGULATOR IC | NJM2930L05 | | | C29 ELECTR. CAPACITOR | CEAS471M6R3 | |
| △ | IC101 PRE AMP IC | CXA1471S | | | C52 ELECTR. CAPACITOR | CEAS101M35 | |
| △ | IC151 SERVO IC | CXA1372S | | | C60 ELECTR. CAPACITOR | CEAS010M50 | |
| △ | IC201 POWER OP-AMP IC | LA6520 | | | C101, 102 ELECTR. CAPACITOR | CEAS101M10 | |
| △ | IC202 POWER OP-AMP IC | LA6517 | | | C103 CERAMIC CAPACITOR | CCCH200J50 | |
| △ | IC301 EFM DEMODULATION IC | CXD2500AQ | | | C104 ELECTR. CAPACITOR | CEAS101M10 | |
| △ | IC351 MICROCOMPUTER IC | PD4394A | | | C110 CERAMIC CAPACITOR | CKCYF103Z50 | |
| △ | IC401 D/A CONVERTER IC | PD2026A | | | C153 ELECTR. CAPACITOR | CEAS101M10 | |
| △ | IC405 OP-AMP IC | NJM4565D-D | | | C155 CERAMIC CAPACITOR | CKCYB182K50 | |
| | IC406 OP-AMP IC | BA15218 | | | C156 CERAMIC CAPACITOR | CGCYX333K25 | |
| | Q101 TRANSISTOR | 2SA854S | | | C157 CERAMIC CAPACITOR | CGCYX103K25 | |
| | Q322 TRANSISTOR | DTC124ES | | | C158, 159 CERAMIC CAPACITOR | CGCYX104K25 | |
| | Q391 TRANSISTOR | 2SC1740S | | | C160 ELECTR. CAPACITOR | CEAS4R7M50 | |
| | Q403, 404 TRANSISTOR | 2SD2144S | | | C161 CERAMIC CAPACITOR | CGCYX104K25 | |
| | Q405 TRANSISTOR | DTC124ES | | | C162 ELECTR. CAPACITOR | CEAS010M50 | |
| △ | Q451, 452 TRANSISTOR | DTA124ES | | | C163 CERAMIC CAPACITOR | CGCYX104K25 | |
| △ | Q453, 454 TRANSISTOR | 2SB1296 | | | C164 CERAMIC CAPACITOR | CGCYX103K25 | |
| △ | D11-14 DIODE | 11ES2 | | | C165 CERAMIC CAPACITOR | CKCYF103Z50 | |
| △ | D52 DIODE | 11ES2 | | | C166 CERAMIC CAPACITOR | CGCYX333K25 | |
| | D54 ZENER DIODE | MTZJ18B | | | C167 CERAMIC CAPACITOR | CGCYX103K25 | |
| | D218 ZENER DIODE | MTZJ6.2B | | | C168 CERAMIC CAPACITOR | CKCYB332K50 | |
| | D351 DIODE | 1SS254 | | | C169 CERAMIC CAPACITOR | CKCYB472K50 | |
| | D391-397 DIODE | 1SS254 | | | C170 CERAMIC CAPACITOR | CKCYF103Z50 | |
| COILS/TRANSFORMERS | | | | | | | |
| L301 AXIAL INDUCTOR | LAU010K | | | C171, 172 CERAMIC CAPACITOR | CKCYB152K50 | | |
| L391 AXIAL INDUCTOR | LAU010K | | | C205 CERAMIC CAPACITOR | CGCYX473K25 | | |
| L395, 396 AXIAL INDUCTOR | LAU010K | | | C216, 217 ELECTR. CAPACITOR | CEAS330M16 | | |
| | | | | C218 CERAMIC CAPACITOR | CGCYX103K25 | | |
| | | | | C230 CERAMIC CAPACITOR | CGCYX104K25 | | |
| | | | | C301 CERAMIC CAPACITOR | CGCYX104K25 | | |
| | | | | C302 ELECTR. CAPACITOR | CEAS471M6R3 | | |
| | | | | C306 CERAMIC CAPACITOR | CKCYB152K50 | | |
| | | | | C307 CERAMIC CAPACITOR | CGCYX473K25 | | |

| Mark | No. | Description | Part No. | Mark | No. | Description | Part No. |
|--------------------------------|----------------------|-------------|----------|------|-----|-------------|----------|
| C308 | CERAMIC CAPACITOR | CGCYX103K25 | | | | | |
| C309 | ELECTR. CAPACITOR | CEASR47M50 | | | | | |
| C351 | ELECTR. CAPACITOR | CEAS471M6R3 | | | | | |
| C353 | CERAMIC CAPACITOR | CKCYF103Z50 | | | | | |
| C361 | CERAMIC CAPACITOR | CKCYF103Z50 | | | | | |
| C393 | CERAMIC CAPACITOR | CCCSL101J50 | | | | | |
| C403 | CERAMIC CAPACITOR | CCCCH120J50 | | | | | |
| C404 | CERAMIC CAPACITOR | CCCCH220J50 | | | | | |
| C413-416 | FILM CAPACITOR | PCL1032 | | | | | |
| C421 | FILM CAPACITOR | PCL1032 | | | | | |
| C429, 430 | CERAMIC CAPACITOR | CCCCH390J50 | | | | | |
| C431, 432 | ELECTR. CAPACITOR | CEAS330M16 | | | | | |
| C433, 434 | CAPACITOR (ALUMINUM) | PCH1107 | | | | | |
| C435-438 | CERAMIC CAPACITOR | CCCCH390J50 | | | | | |
| C441, 442 | FILM CAPACITOR | PCL1030 | | | | | |
| C451, 452 | ELECTR. CAPACITOR | CEAS4R7M50 | | | | | |
| C461 | CERAMIC CAPACITOR | CKCYF103Z50 | | | | | |
| RESISTORS | | | | | | | |
| R51-54 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R101-110 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R153-158 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R160 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R185, 186 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R201 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R205, 206 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R216 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R218 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R226-230 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R301-312 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R319 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R355-361 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R364, 365 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R367 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R391-396 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R401 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R405-407 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R427-430 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R435-448 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R451-462 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R470, 471 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| R495-498 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| VR102 | VR | RCP1046 | | | | | |
| VR103 | VR | RCP1044 | | | | | |
| VR151, 152 | VR | RCP1046 | | | | | |
| OTHERS | | | | | | | |
| CN101 | CONNECTOR | 52045-1610 | | | | | |
| CN351 | CONNECTOR | HLEM32S-1 | | | | | |
| JA391, 392 | JACK/12V | PKN1004 | | | | | |
| JA393 | JACK | PKN1005 | | | | | |
| JA401 | JACK | PKB1009 | | | | | |
| X351 | CERAMIC RESONATOR | VSS1014 | | | | | |
| X401 | XTAL RES (OSC) | PSS1008 | | | | | |
| FUNCTION BOARD ASSEMBLY | | | | | | | |
| SEMICONDUCTORS | | | | | | | |
| D701-707 | DIODE | 1SS254 | | | | | |
| SWITCHES | | | | | | | |
| S701-726 | SWITCH | PSG1006 | | | | | |
| REMOTE SENSOR | | | | | | | |
| SBX1610-51 | | | | | | | |
| RESISTORS | | | | | | | |
| R701 | CARBONFILM RESISTOR | RD1/6PM□□□J | | | | | |
| OTHERS | | | | | | | |
| CN701 | CONNECTOR | HLEM32R-1 | | | | | |
| V701 | FL INDICATOR TUBE | PEL1065 | | | | | |
| SW PCB ASSEMBLY | | | | | | | |
| SEMICONDUCTORS | | | | | | | |
| D801 | LED | PCX1019 | | | | | |
| SWITCHES | | | | | | | |
| S801 | SWITCH | PSG1006 | | | | | |
| HEADPHONE PCB ASSEMBLY | | | | | | | |
| COILS/TRANSFORMERS | | | | | | | |
| L501 | AXIAL COIL | LAUR22K | | | | | |
| L502, 503 | AXIAL INDUCTOR | LAU010K | | | | | |
| CAPACITORS | | | | | | | |
| C501, 502 | CERAMIC CAPACITOR | CKCYF103Z50 | | | | | |
| C503 | CERAMIC CAPACITOR | CKCYF473Z50 | | | | | |
| RESISTORS | | | | | | | |
| VRS01 | VARIABLE RESISTOR | PCS1003 | | | | | |
| OTHERS | | | | | | | |
| JA501 | JACK | RKN1002 | | | | | |

6. ADJUSTMENTS

6.1 Adjustment Methods

If a disc player is adjusted incorrectly or inadequately, it may malfunction or not work at all even though there is nothing at all wrong with the pickup or the circuitry. Adjust correctly following the adjustment procedure.

● Adjustment items/verification items and order

| Step | Item | Test point | Adjustment location |
|------|--|---|---|
| 1 | Focus offset adjustment | TP1, Pin 6(FCS. ERR) | VR103(FCS. OFS) |
| 2 | Grating adjustment | TP1, Pin 2(TRK. ERR) | Grating adjustment slit |
| 3 | Tracking error balance adjustment | TP1, Pin 2(TRK. ERR) | VR102(TRK. BAL) |
| 4 | Pickup radial/tangential direction tilt adjustment | TP1, Pin 1(RF) | Radial tilt adjustment screw, Tangential tilt adjustment screw |
| 5 | RF level adjustment | TP1, Pin 1(RF) | VR1(RF level) |
| 6 | Focus servo loop gain adjustment | TP1, Pin 5(FCS. IN) TP1, Pin 6(FCS. ERR) | VR152(FCS. GAN) |
| 7 | Tracking servo loop gain adjustment | TP1, Pin 3(TRK. IN) TP1, Pin 2(TRK. ERR) | VR151(TRK. GAN) |
| 8 | Focus error signal verification | TP1, Pin 6(FCS. ERR) | _____ |

● Abbreviation table

| | |
|----------|-------------------|
| FCS. ERR | :Focus Error |
| FCS. OFS | :Focus Offset |
| TRK. ERR | :Tracking Error |
| TRK. BAL | :Tracking Balance |
| FCS. GAN | :Focus Gain |
| TRK. GAN | :Tracking Gain |
| FCS. IN | :Focus In |
| TRK. IN | :Tracking In |

● Measuring instruments and tools

1. Dual trace oscilloscope (10:1 probe)
2. Low-frequency oscillator
3. Test disc (YEDS - 7)
4. 12-cm disc (with at least about 70 minutes recording)
5. Low-pass filter ($39 \text{ k}\Omega + 0.001 \mu\text{F}$)
6. Resistor ($100 \text{ k}\Omega$)
7. Hexagonal wrench (1.5mm)
8. Standard tools

● Test point and adjustment variable resistor positions

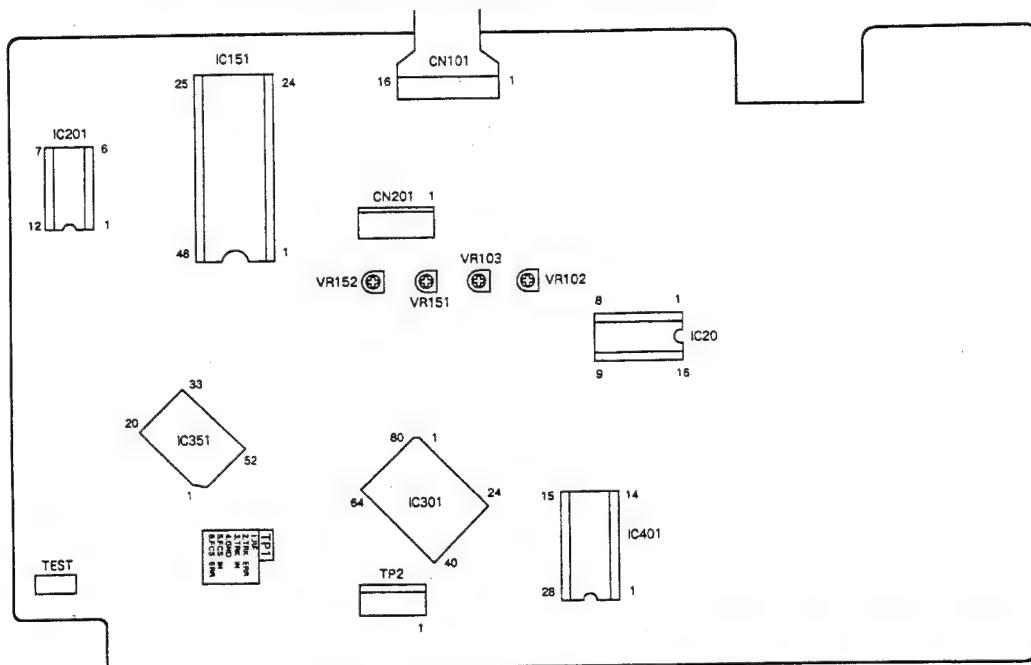


Figure 1 Adjustment Locations

● Notes

1. Use a 10:1 probe for the oscilloscope.
2. All the knob positions (settings) for the oscilloscope in the adjustment procedures are for when a 10:1 probe is used.

● Test mode

These models have a test mode so that the adjustments and checks required for service can be carried out easily. When these models are in test mode, the keys on the front panel work differently from normal. Adjustments and checks can be carried out by operating these keys with the correct procedure. For these models, all adjustments are carried out in test mode.

[Setting these models to test mode]

How to set this model into test mode.

1. Unplug the power cord from the AC socket.
2. Short the test mode jumper wires. (See Figure 1.)
3. Plug the power cord back into the AC socket.

When the test mode is set correctly, the display is different from what it usually is when the power is turned on. If the display is still the same as usual, test mode has not been set correctly, so repeat Steps 1 – 3.

[Release from test mode]

Here is the procedure for releasing the test mode:

1. Press the STOP key and stop all operations.
2. Unplug the power cord from the AC socket.

[Operations of the keys in test mode]

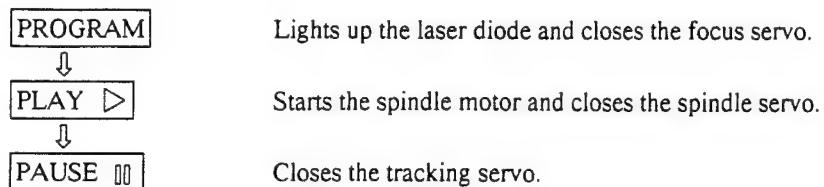
| Code | Key name | Function in test mode | Explanation |
|-------------|-----------------|------------------------------|---|
| | PROGRAM | Focus servo close | <p>The laser diode is lit up and the focus actuator is lowered, then raised slowly and the focus servo is closed at the point where the objective lens is focused on the disc.</p> <p>With the player in this state, if you lightly rotate the stopped disc by hand, you can hear the sound the focus servo.</p> <p>If you can hear this sound, the focus servo is operating correctly. If you press this key with no disc mounted, the laser diode lights up, the focus actuator is pulled down, then the actuator is raised and lowered twice and returned to its original position.</p> |
| ▶ | PLAY | Spindle servo ON | <p>Starts the spindle motor in the clockwise direction and when the disc rotation reaches the prescribed speed (about 500 rpm at the inner periphery), sets the spindle servo in a closed loop.</p> <p>Be careful. Pressing this key when there is no disc mounted makes the spindle motor run at the maximum speed.</p> <p>If the focus servo does not go correctly into a closed loop or the laser light shines on the mirror section at the outermost periphery of the disc, the same symptom is occurred.</p> |
| □□ | PAUSE | Tracking servo close/open | <p>Pressing this key when the focus servo and spindle servo are operating correctly in closed loops puts the tracking servo into a closed loop, displays the track number being played back and the elapsed time on the front panel, and outputs the playback signal.</p> <p>If the elapsed time is not displayed or not counted correctly or the audio is not played back correctly, it may be that the laser is shining on the section with no sound recorded at the outer edge of the disc, that something is out of adjustment, or that there is some other problem.</p> <p>This key is a toggle key and open/close the tracking servo alternately. This key has no effect if no disc is mounted.</p> |

| Code | Key name | Function in test mode | Explanation |
|------|-------------------|-----------------------------|--|
| ◀◀ | MANUAL SEARCH REV | Carriage reverse (inwards) | Moves the pickup position toward the inner diameter of the disc. When this key is pressed with the tracking servo in a closed loop, the tracking servo automatically goes into an open loop. Since the motor does not automatically stop at the mechanical end point in test mode, be careful with this operation. |
| ▶▶ | MANUAL SEARCH FWD | Carriage forward (outwards) | Moves the pickup position toward the outer diameter of the disc. When this key is pressed with the tracking servo in a closed loop, the tracking servo automatically goes into an open loop. Since the motor does not automatically stop at the mechanical end point in test mode, be careful with this operation. |
| □ | STOP | Stop | Switches off all the servos and initialized. The pickup remains where it was when this key was pressed. |
| △ | OPEN/CLOSE | Disc tray open/close | Open/close the disc tray. This key is a toggle key and open/close tray alternately. Pressing this key when the disc is turning stops the disc, then opens the tray. This key operation does not affect the position of the pickup. |

[How to play back a disc in test mode]

In test mode, since the servos operate independently, playing back a disc requires that you operate the keys in the correct order to close the servos.

Here is the key operation sequence for playing back a disc in test mode.



Wait at least 2-3 seconds between each of these operations.

1. Focus Offset Adjustment

| | | | |
|--------------------------------------|--|---|---|
| ● Objective | Sets the DC offset for the focus error amp. | | |
| ● Symptom when out of adjustment | The model does not focus in and the RF signal is dirty. | | |
| ● Measurement instrument connections | Connect the oscilloscope to TP1, Pin 6 (FCS. ERR) [Settings] 5 mV/division 10 ms/division DC mode | ● Player state ● Adjustment location ● Disc | Test mode, stopped (just the Power switch on) VR103 (FCS. OFS) None needed |

[Procedure]

Adjust VR103 (FCS. OFS) so that the DC voltage at TP1, Pin 6 (FCS. ERR) is -150 ± 50 mV.

2. Grating Adjustment

| | | | |
|--------------------------------------|---|---|--|
| ● Objective | To align the tracking error generation laser beam spots to the optimum angle on the track. | | |
| ● Symptom when out of adjustment | Play does not start, track search is impossible, tracks are skipped. | | |
| ● Measurement instrument connections | <p>Connect the oscilloscope to TP1, Pin 2 (TRK. ERR) via a low pass filter. (See Figure 2)</p> <p>[Settings] 50 mV/division 5 ms/division DC mode</p> | <ul style="list-style-type: none"> ● Player state ● Adjustment location ● Disc | <p>Test mode, focus and spindle servos closed and tracking servo open</p> <p>Pickup grating adjustment slit</p> <p>12-cm disc. (YEDS-7 can not be used.)</p> |

[Procedure]

1. Move the pickup to the outer edge of the disc with the MANUAL SEARCH FWD \gg or REV \ll key.
2. Press the PROGRAM key, then the PLAY \triangleright key in that order to close the focus servo then the spindle servo.
3. Insert an ordinary screwdriver into the grating adjustment slit and adjust the grating to find the null point. For more details, see the next page.
4. If you slowly turn the screwdriver counterclockwise from the null point, the amplitude of the wave gradually increases, then if you continue turning the screwdriver, the amplitude of the wave becomes smaller again. Turn the screwdriver counterclockwise from the null point and set the grating to the first point where the wave amplitude reaches its maximum.

Reference : Figure 3 shows the relation between the angle of the tracking beam with the track and the waveform.

Note : The amplitude of the tracking error signal is about 3 Vp-p (when a $39\text{ k}\Omega + 0.001\text{ }\mu\text{F}$ low pass filter is used). If this amplitude is extremely small (2 Vp-p or less), the objective lens or the pickup malfunction may be the cause. If the difference between the amplitude of the error signal at the innermost edge and outermost edge of the disc is more than 10%, the grating is not adjusted to the optimum point, so adjust it again.

5. Return the pickup to more or less midway across the disc with the MANUAL SEARCH REV \ll key, press the PAUSE $\square\square$ key and double check that the track number and elapsed time are displayed on the front panel. If they are not displayed at this time or the elapsed time changes irregularly, double check the null point and adjust the grating again.

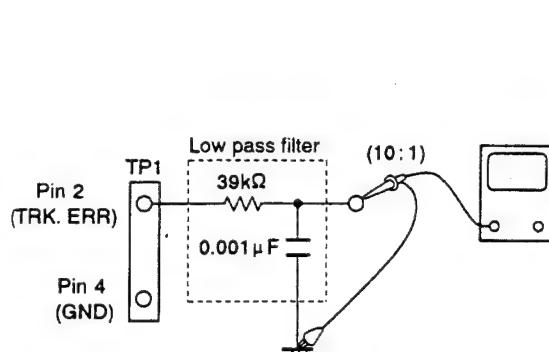
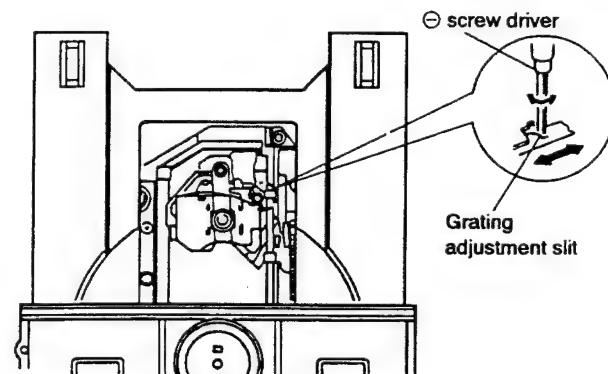


Figure 2



Adjustment locations

[How to find the null point]

When you insert the regular screwdriver into the slit for the grating adjustment and change the grating angle, the amplitude of the tracking error signal at TP1, Pin 2 changes. Within the range for the grating, there are five or six locations where the amplitude of the wave reaches a minimum. Of these five or six locations, there is only one at which the envelope of the waveform is smooth. This location is where the three laser beams divided by the grating are all right above the same track. (See Figure 3.)

This point is called the null point. When adjusting the grating, this null point is found and used as the reference position.

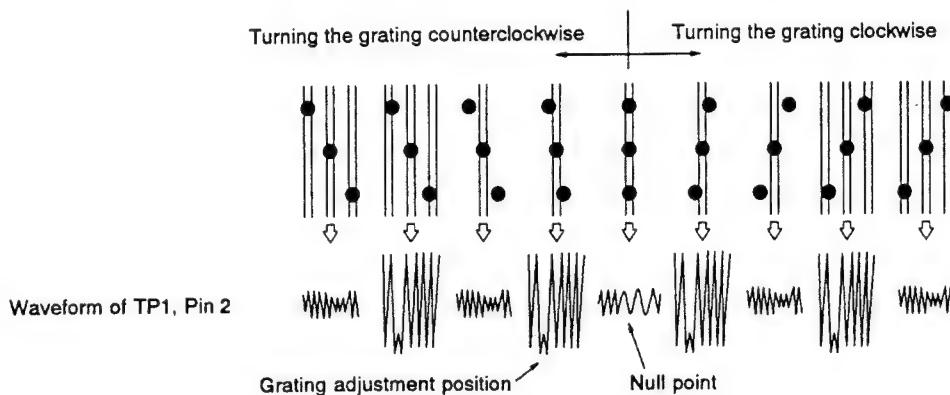
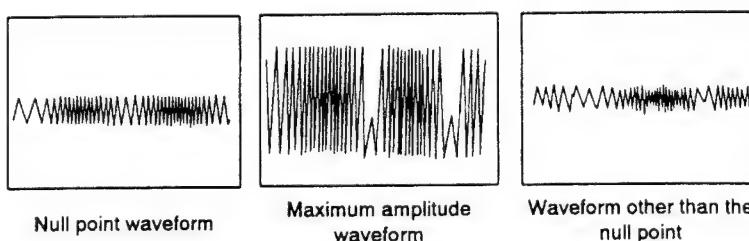


Figure 3

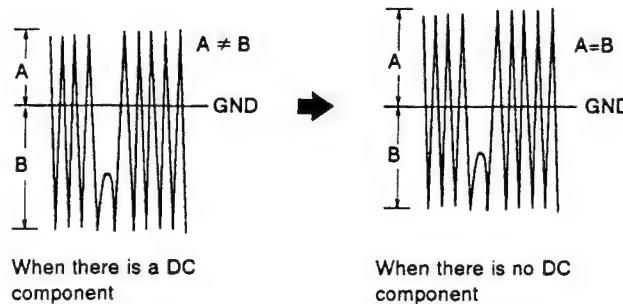


3. Tracking Error Balance Adjustment

| | | | |
|--------------------------------------|---|--|---|
| ● Objective | To correct for the variation in the sensitivity of the tracking photodiode. | | |
| ● Symptom when out of adjustment | Play does not start or track search is impossible. | | |
| ● Measurement instrument connections | <p>Connect the oscilloscope to TP1, Pin 2(TRK. ERR). This connection may be via a low pass filter.</p> <p>[Settings] 50 mV/division 5 ms/division DC mode</p> | <p>● Player state</p> <p>● Adjustment location</p> <p>● Disc</p> | <p>Test mode, focus and spindle servos closed and tracking servo open</p> <p>VR102 (TRK. BAL)</p> <p>YEDS-7</p> |

[Procedure]

1. Move the pickup to midway across the disc ($R=35$ mm) with the MANUAL SEARCH FWD $\triangleright\triangleright$ or REV $\triangleleft\triangleleft$ key.
2. Press the PROGRAM key, then the PLAY \triangleright key in that order to close the focus servo then the spindle servo.
3. Line up the bright line (ground) at the center of the oscilloscope screen and put the oscilloscope into DC mode.
4. Adjust VR102 (TRK. BAL) so that the positive amplitude and negative amplitude of the tracking error signal at TP1, Pin 2 (TRK. ERR) are the same (in other words, so that there is no DC component).



4. Pickup Radial/Tangential Tilt Adjustment

| | | | |
|--------------------------------------|---|---|---|
| ● Objective | To adjust the angle of the pickup relative to the disc so that the laser beams are shone straight down into the disc for the best read out of the RF signals. | | |
| ● Symptom when out of adjustment | Sound broken; some discs can be played but not others. | | |
| ● Measurement instrument connections | Connect the oscilloscope to TP1, Pin 1 (RF). [Settings] 20 mV/division 200 ns/division AC mode | <ul style="list-style-type: none"> ● Player state ● Adjustment location ● Disc | Test mode, play Pickup radial tilt adjustment screw and tangential tilt adjustment screw 12-cm disc. (YEDS-7 can not be used.) |

[Procedure]

1. Press the MANUAL SEARCH FWD \gg or REV \ll key so that the radial/tangential tilt screws can be adjusted. Press the PROGRAM key, the PLAY \triangleright key, then the PAUSE $\square\square$ key in that order to close the focus servo then the spindle servo and put the player into play mode.
2. First, adjust the radial tilt adjustment screw with an 1.5mm hexagonal wrench so that the eye pattern (the diamond shape at the center of the RF signal) can be seen the most clearly.
3. Next, adjust the tangential tilt adjustment screw with an 1.5mm hexagonal wrench so that the eye pattern (the diamond shape at the center of the RF signal) can be seen the most clearly (Figure 5).
4. Adjust the radial tilt adjustment screw and the tangential tilt adjustment screw again so that the eye pattern can be seen the most clearly. As necessary, adjust the two screws alternately so that the eye pattern can be seen the most clearly.

Note: Radial and tangential mean the directions relative to the disc shown in Figure 4.

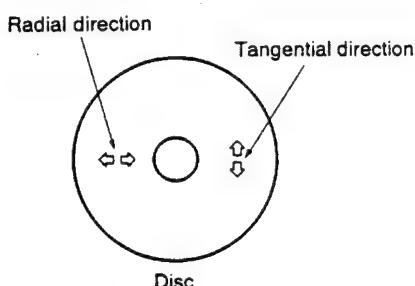
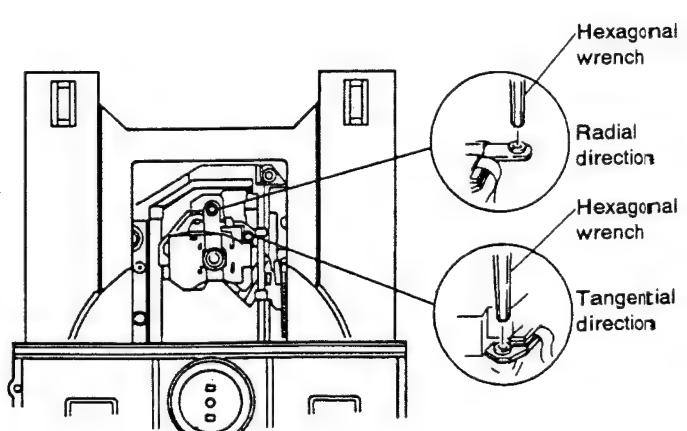


Figure 4



Adjustment locations

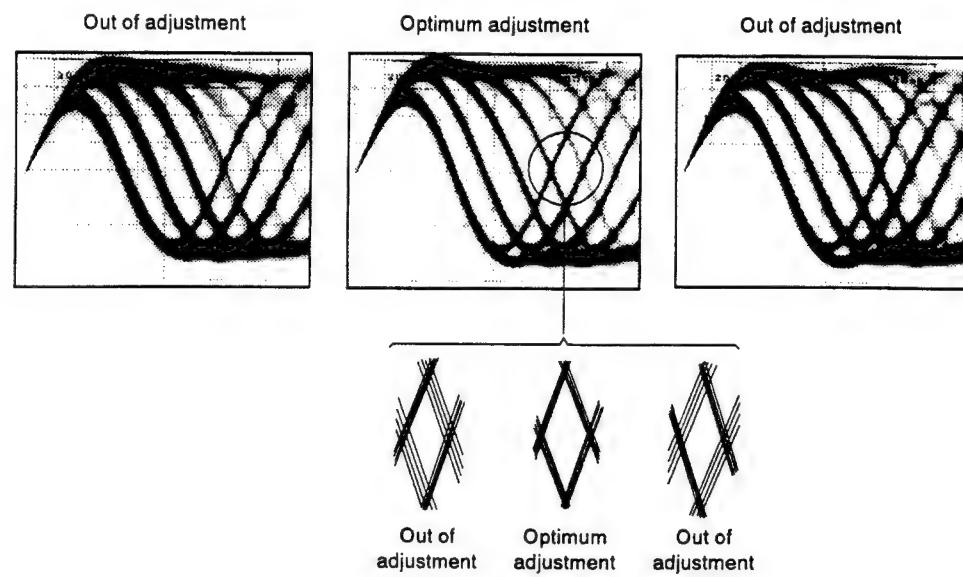


Figure 5 Eye pattern

5. RF Level Adjustment

| | | | |
|--------------------------------------|---|---|--|
| ● Objective | To optimize the playback RF signal amplitude | | |
| ● Symptom when out of adjustment | No play or no search | | |
| ● Measurement instrument connections | <p>Connect the oscilloscope to TP1, Pin 1 (RF).</p> <p>[Settings] 50 mV/division 10 ms/division AC mode</p> | <ul style="list-style-type: none"> ● Player state ● Adjustment location ● Disc | <p>Test mode, play</p> <p>VR1(laser power)</p> <p>YEDS-7</p> |

[Procedure]

1. Move the pickup to midway across the disc ($R=35\text{ mm}$) with the MANUAL SEARCH FWD \gg or REV \ll key, then press the PROGRAM key, then the PLAY \triangleright key in that order to close the respective servos and put the player into play mode.
2. Adjust VR1 (laser power) so that the RF signal amplitude is $1.2\text{ V}_{\text{p-p}} \pm 0.1\text{ V}$.

6. Focus Servo Loop Gain Adjustment

| | | | |
|--------------------------------------|--|---|---|
| ● Objective | To optimize the focus servo loop gain. | | |
| ● Symptom when out of adjustment | Playback does not start or focus actuator noisy. | | |
| ● Measurement instrument connections | See figure 6. [Settings] CH1 CH2 20 mV/division 5 mV/division X-Y mode | ● Player state ● Adjustment location ● Disc | Test mode, play VR152 (FCS. GAN) YEDS-7 |

[Procedure]

1. Set the AF generator output to 1.2 kHz and 1 Vp-p.
2. Press the MANUAL SEARCH FWD \gg or REV \ll key to move the pickup to halfway across the disc ($R=35$ mm), then press the PROGRAM key, the PLAY \triangleright key, then the PAUSE $\|$ key in that order to close the corresponding servos and put the player into play mode.
3. Adjust VR152 (FCS. GAN) so that the Lissajous waveform is symmetrical about the X axis and the Y axis.

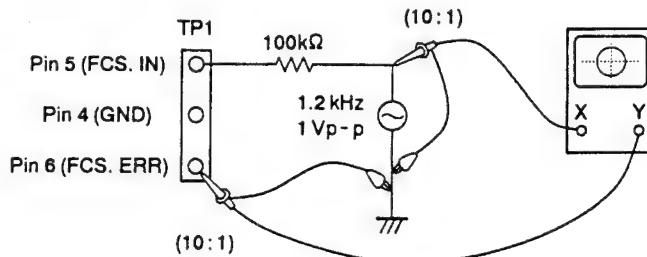
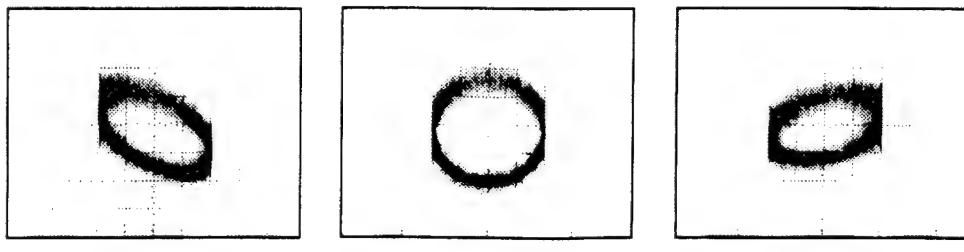


Figure 6

Focus Gain Adjustment



Higher gain

Optimum gain

Lower gain

7. Tracking Servo Loop Gain Adjustment

| | | | |
|--------------------------------------|---|---|---|
| ● Objective | To optimize the tracking servo loop gain. | | |
| ● Symptom when out of adjustment | Playback does not start, during searches the actuator is noisy, or tracks are skipped. | | |
| ● Measurement instrument connections | See Figure 7. [Settings] CH1 CH2 50 mV/division 20 mV/division X - Y mode | ● Player state ● Adjustment location ● Disc | Test mode, play VR151 (TRK. GAN) YEDS-7 |

[Procedure]

1. Set the AF generator output to 1.2 kHz and 2 Vp-p.
2. Press the MANUAL SEARCH FWD \gg or REV \ll key to move the pickup to halfway across the disc ($R=35$ mm), then press the PROGRAM key, the PLAY \triangleright key, then the PAUSE $\square\square$ key in that order to close the corresponding servos and put the player into play mode.
3. Adjust VR151 (TRK. GAN) so that the Lissajous waveform is symmetrical about the X axis and the Y axis.

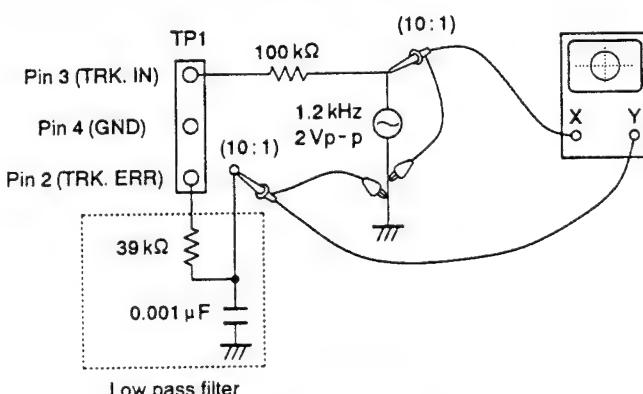
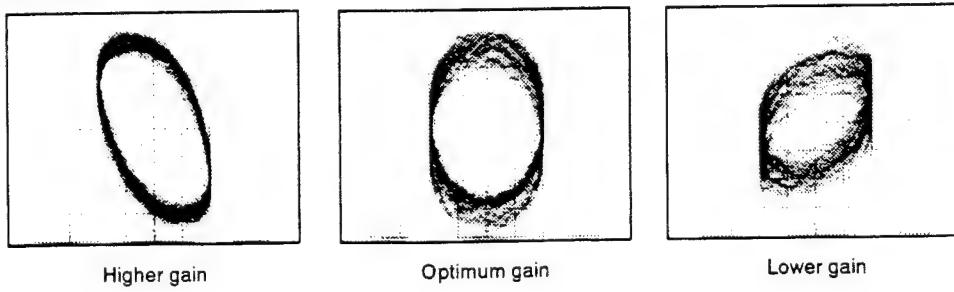


Figure 7

Tracking Gain Adjustment



8. Focus Error Signal (Focus S Curve) Verification

| | | | |
|--------------------------------------|---|---|-----------------------------------|
| ● Objective | To judge whether the pickup is ok or not by observing the focus error signal. The pickup is judged from the amplitude of the tracking error signal (as discussed in the section on adjusting the tracking error balance) and the waveform for the focus error signal. | | |
| ● Symptom when out of adjustment | | | |
| ● Measurement instrument connections | Connect the oscilloscope to TP1, Pin 6 (FCS. ERR). [Settings] 100 mV/division 5 ms/division DC mode | ● Player state ● Adjustment location ● Disc | Test mode, stop None YEDS-7 |

[Procedure]

1. Connect TPI Pin 5 to ground.
2. Mount the disc.
3. While watching the oscilloscope screen, press the PROGRAM key and observe the waveform in Figure 8 for a moment. Verify that the amplitude is at least 2.5 V_{p-p} and that the positive and negative amplitude are about equal. Since the waveform is only output for a moment when the PROGRAM key is pressed, press this key over and over until you have checked the waveform.

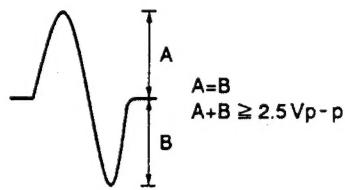


Figure 8

[Judging the pickup]

Do not judge the pickup until all the adjustments have been made correctly. In the following cases, there may be something wrong with the pickup.

1. The tracking error signal amplitude is extremely small (less than 2 V_{p-p}).
2. The focus error signal amplitude is extremely small (less than 2.5 V_{p-p}).
3. The positive and negative amplitudes of the focus error signal are extremely asymmetrical (2 : 1 ratio or more).
4. The RF signal is too small (less than 0.8 V_{p-p}) and even if VRI (laser power) is adjusted, the RF signal can not be brought up to the standard level.

7. FOR PD-201/KC, KUXJS, KCXJS, PD-101/KU, KC, KUXJS AND KCXJS TYPES

NOTES:

- Parts without part number cannot be supplied.
- The Δ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
- Parts marked by “ \odot ” are not always kept in stock. Their delivery time may be longer than usual or they may be unavailable.

PD-201/KC, KUXJS, KCXJS, PD-101/KU, KC, KUXJS, KCXJS and PD-201/KU have the same construction except for the following:

| Mark | Symbol & Description | Part No. | | | | | | | |
|---------|--|--------------------|--------------------|-----------------------|-----------------------|--------------------|--------------------|-----------------------|-----------------------|
| | | PD-201/ KU type | PD-201/ KC type | PD-201/ KUXJS type | PD-201/ KCXJS type | PD-101/ KU type | PD-101/ KC type | PD-101/ KUXJS type | PD-101/ KCXJS type |
| \odot | Display window B | PAM1543 | PAM1543 | PAM1543 | PAM1543 | ..... | ..... | ..... | ..... |
| | Display window A | ..... | ..... | ..... | ..... | PAM1542 | PAM1542 | PAM1542 | PAM1542 |
| | 32P F.F.C/30V | PDD1041 | PDD1041 | PDD1041 | PDD1041 | ..... | ..... | ..... | ..... |
| | 30P F.F.C/30V | ..... | ..... | ..... | ..... | PDD1049 | PDD1049 | PDD1049 | PDD1049 |
| | Function panel assembly | PEA1191 | PEA1191 | PEA1191 | PEA1191 | PEA1192 | PEA1192 | PEA1192 | PEA1192 |
| | CD Packing case | PHG1748 | PHG1822 | PHG1762 | PHG1825 | PHG1747 | PHG1821 | PHG1780 | PHG1824 |
| | Function panel C | PNW2185 | PNW2185 | PNW2195 | PNW2195 | ..... | ..... | ..... | ..... |
| | Function panel A | ..... | ..... | ..... | ..... | PNW2194 | PNW2194 | PNW2194 | PNW2194 |
| | Bonnet | PYY1147 | PYY1147 | PYY1129 | PYY1129 | PYY1147 | PYY1147 | PYY1129 | PYY1129 |
| | Operating Instructions (English) | PRB1159 | ..... | PRB1159 | ..... | PRB1159 | ..... | PRB1159 | ..... |
| \odot | Operating Instructions (English /German) | ..... | PRE1154 | ..... | PRE1154 | ..... | PRE1154 | ..... | PRE1154 |
| | Mother board assembly | PWM1657 | PWM1657 | PWM1657 | PWM1657 | PWM1653 | PWM1653 | PWM1653 | PWM1653 |
| | Sub board assembly | PWX1214 | PWX1214 | PWX1214 | PWX1214 | PWX1213 | PWX1213 | PWX1213 | PWX1213 |
| | └ Function board assembly | Non supply | Non supply | Non supply | Non supply | Non supply | Non supply | Non supply | Non supply |
| | Remote control unit (CU-PD046) | PWW1061 | PWW1061 | PWW1061 | PWW1061 | ..... | ..... | ..... | ..... |

MOTHER BOARD ASSEMBLY (PWM1653)

PWM1653 and PWM1657 have the same construction except for the following:

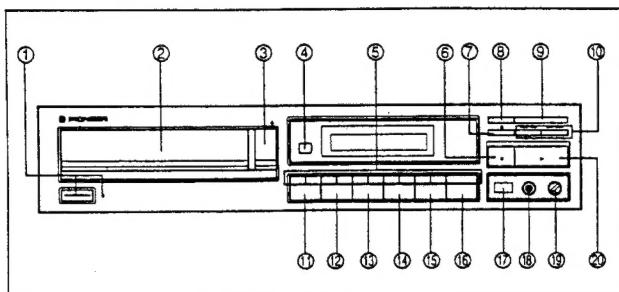
| Mark | Symbol & Description | Part No. | | Remarks |
|------|--|---|---|---------|
| | | PWM1657 | PWM1653 | |
| | C417 C433,C434 C451, C452 D391 IC405 | PCH1107 CEAS4R7M50 1SS254 NJM4565D-D | CKCYF103Z50 CEAS220M25 NJM4558D-D | |
| | L301 Q451, Q452 Q453, Q454 R406, R407 R445, R446 | LAU010K DTA124ES 2SB1296 RD1/6PM471J RD1/6PM271J | RD1/6PM471J | |
| | R451, R452 R453, R454 R455-R458 R459-R462 CN351 | RD1/6PM473J RD1/6PM470J RD1/6PM102J RD1/6PM271J HLEM32S-1 | HLEM30S-1 | |

FUNCTION BOARD ASSEMBLY

Function board assemblies of PD-101/KU, KC, KUXJS, KCXJS and PD-201/KU have the same construction except for the following:

| Mark | Symbol & Description | Part No. | | Remarks |
|------|---|----------------------------------|--|---------|
| | | PD-201/KU type | PD-101/KU, KC, KUXJS and KCXJS types | |
| | CN701 FFC connector (32P) CN701 FFC connector (30P) Remote control detector | HLEM32R-1 SBX1610-51 | HLEM30R-1 | |

8. PANEL FACILITIES



FRONT PANEL

- ① POWER STANDBY/ON switch and STANDBY indicator
- ② Disc tray
- ③ OPEN/CLOSE button (▲)
- ④ Remote sensor
Receives the signal from the remote control unit.
• The PD-101 is not equipped with the remote sensor.
- ⑤ TRACK NUMBER/Digit buttons
(1 - 10, >10)
- ⑥ Pause button (II)
- ⑦ Stop button (■)
- ⑧ REPEAT button
- ⑨ RANDOM PLAY button
- ⑩ Track/Manual search buttons
(◀◀◀/▶▶▶)
- ⑪ PROGRAM button
- ⑫ CHECK button
- ⑬ CLEAR button
- ⑭ HI-LITE SCAN button
- ⑮ COMPU/AUTO EDIT button
- ⑯ TIME button
- ⑰ PEAK SEARCH button
- ⑱ Headphones jack (PHONES)
- ⑲ Headphones volume control (LEVEL)
- ⑳ Play button (▶)

9. SPECIFICATIONS

1. General

| | |
|--|--|
| Type | Compact disc digital audio system |
| Power requirements | |
| European model | AC 220 - 240 V, 50/60 Hz |
| U.K. and Australian models | AC 220 - 240 V, 60 Hz |
| U.S. and Canadian models | AC 120 V, 60Hz |
| Other models | AC 110 - 127/220 - 240 V (Switchable), 50/60 Hz |
| Power consumption | |
| U.S. and Canadian models | 12 W |
| Other models | 13 w |
| Operating temperature | +5°C - +35°C +41°F - +95°F |
| Weight | 3.5 kg (7 lb, 12 oz) |
| External dimensions | |
| U.S., Canadian, U.K. and European models | 420(W) X 276(D) X 101(H) mm 16-9/16(W) X 10-7/8(D) X 4(H) in |
| Other models | 420(W) X 276(D) X 96(H) mm 16-9/16(W) X 10-7/8(D) X 3-3/4(H) in |

2. Audio section

| | |
|------------------------------------|---|
| Frequency response | 2 Hz - 20 kHz |
| S/N ratio | |
| U.S. and Canadian models of PD-101 | 98 dB or more (EIAJ) |
| Other models | 102 dB or more (EIAJ) |
| Dynamic range | 96 dB or more (EIAJ) |
| Harmonic distortion | 0.003% or less (EIAJ) |
| Output voltage | 2.0V |
| Wow and flutter | Limit of measurement (±0.001% W.PEAK) or less (EIAJ) |
| Channels | 2-channel (stereo) |

3. Output terminal

| | |
|--|--|
| Audio line output jacks | |
| Control input/output jacks (available with the PD-201 and U.S. and Canadian models of the PD-201 only; Not available with models for military zones (multi-voltage types)) | |
| CD-DECK SYNCHRO jack | |
| Headphone jack (with volume control) | |

4. Accessories

| | |
|---|---|
| • Remote control unit (PD-201 only) | 1 |
| • Size AAA/R03/dry batteries (PD-201 only) | 2 |
| • Control cord (provided with PD-101 and U.S. and Canadian models of PD-201 only; Not available with models for military zones (multi-voltage types)) | 1 |
| • Output cable | 1 |
| • Operating instructions | 1 |

NOTE:

Specifications and design subject to possible modification without notice, due to improvements.